Regional Harmonization of Regulatory Frameworks and Tools for Improved Electricity Regulation in COMESA

Elaboration and Adoption of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI) for COMESA

Final Framework Report

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Abbreviations

Acronym	Full form
AfDB	African Development Bank
AfSEM	African Single Electricity Market
ADFI	Average duration of forced interruptions
ANOFT	Average number of forced outages for all transmission lines
AUC	African Union Commission
BETTA	British Electricity Trading Transmission arrangements
BEIS	Department for Business, Energy and Industrial Strategy
CAIDI	Customer Average Interruption Duration Index
COMESA	Common Market for Eastern and Southern Africa
DSO	Distribution System Operator
DG	Director General
EAC	East African Community
EAPP	Eastern Africa Power Pool
EBIT	Earnings Before Interest and Tax
EgyptERA	Egyptian Electric Utility and Consumer Protection Regulatory Agency
EHV	Extra High Voltage
EPRA	Energy and Petroleum Regulatory Authority *(Kenya)*
ERB	Energy Regulatory Board, Zambia
EREA	Energy Regulators Association of East Africa
ERI	Electricity Regulatory Index for Africa
EU	European Union
FERC	Federal Energy Regulatory Commission
FY	Financial Year
GB	Great Britain
GDP	Gross Domestic Product
GWh	Giga Watt hour
HHI	Herfindahl-Hirschman Index for Generation function
HV	High Voltage
ICE	Intercontinental exchange
IEA	International Energy Agency
IMS	Information Management System
IPP	Independent Power Producer
IT	Information Technology

Acronym	Full form
KPLC	Kenya Power and Lighting Company
KPI	Key Performance Indicators
kg	Kilo gram
kms	kilo meters
kV	Kilo Volt
kWh	Kilo Watt Hours
LV	Low Voltage
MV	Medium Voltage
MVA	Mega Volt Ampere
MW	Mega Watt
MWh	Mega Watt Hours
OFGEM	Office of the Gas and Electricity Markets
PPA	Power Purchase Agreement
PTWG	Project Technical Working Group
RAERESA	Regional Association of Energy Regulators for Eastern and Southern Africa
RERP	Regional Electricity Regulatory Principles
RE	Renewable Energy
SOP	Standard Operating Procedure
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
T & D	Transmission and Distribution
TPA	Third Party Access
TSO	Transmission System Operator
UK	United Kingdom
USc	US Cents
USD	US Dollar
UKPI	Utility Key Performance Indicators
VRPPS	Variable renewable energy-based power plants

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1 Introduction

Despite being endowed with significant energy resources; the Common Market for Eastern and Southern Africa (COMESA) countries face enormous challenges in increasing energy access to its ever-increasing population and building a robust physical energy infrastructure. Average electricity access rate in the COMESA region is slightly above 50%.

Many countries in the region continue to face an energy crisis and are plagued by challenges that include, absence of robust regulatory frameworks, under-performing utilities, lack of funding for new infrastructure, overreliance on coal and hydropower, lack of cost-reflective tariffs and heavy and unsustainable reliance on biomass energy (traditional fuels such as wood fuels, charcoal, animal waste etc.). The slow pace of power sector development hampers overall economic growth and leads to an unsustainable energy system.

Addressing the energy crisis calls for harmonized policy and regulatory frameworks to strengthen operational and financial efficiency of power utilities and create an enabling environment for attracting private sector investment. This will enable the cost-effective expansion of generation and transmission infrastructure that will facilitate regional energy trade and increase electricity access.

The COMESA countries face several challenges to harmonize sector regulation and ensure uniform application of rules and standards for the assessment of performance, particular amongst them are:

- **Regulatory Guide:** Absence of regionally endorsed high-level principles and practices to guide regulators to develop their regulatory frameworks uniformly and consistently in accordance with the regional framework

- **Grid Access:** Lack of a regional Grid Code and common rules for connecting to the networks (including connection charging principles and Third-Party Access to the networks).

- **Tariffs:** Lack of harmonized approach to tariffs particularly – transmission and wheeling charges, lack of cost reflective tariffs as well as key performance indicators (KPI) to monitor utility performance

- **Planning Coordination:** Uncoordinated energy sector planning and development leads to weak sector governance which hampers power sector development

It is this context, that the **Regional Harmonization of Regulatory Frameworks and Tools for Improved Electricity Regulation in COMESA (the "Project")** is being undertaken to enhance the sustainability of the electricity sector of the region through **effective, uniform, transparent and enforceable regulatory frameworks that set out clear principles, rules, processes, and standards for the COMESA region** funded by the **African Development Bank (AfDB)**. The Project covers 12 COMESA Member States (Burundi, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Rwanda, Somalia, Sudan, Tunisia, and Uganda) and South Sudan.

Project overview

The project comprises of the following components:

- **Component 1:** Elaboration and Adoption of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI) for COMESA

- **Component 2:** Harmonized Comparison of Electricity Tariffs (HCET) and Cost Reflectivity Assessment Framework Tool (CRAFT); and
- **Component 3**: Development of an Information Management System (IMS)

COMESA is the Executing Agency of the Project and the Regional Association of Energy Regulators for Eastern and Southern Africa (RAERESA) of COMESA is the Implementing Agency of the Project assisted by the Energy Regulators Association of East Africa (EREA) of the East African Community (EAC).

Under this assignment, only Components 1 and 2 are being covered; Component 3 is being undertaken under a separate consultancy assignment.

Scope of work

The assignment covers the first two components of the Project and has been divided into the following two workstreams:

Workstream 1: Elaboration and Adoption of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI) for COMESA; and

Workstream 2: Harmonised Comparison of Electricity Tariffs (HCET) and Cost Reflectivity Assessment Framework Tool (CRAFT)

1.1 Workstream 1

This component on Elaboration of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI) for COMESA will support COMESA to adopt and contextualise best regulatory principles for the COMESA region. It will involve the development of guidelines and frameworks that espouse regulatory principles, practices, and key performance indicators (KPIs) to be adopted by council of ministers of COMESA that will be applied as a tool for regulatory peer reviews in the region to track progress of adoption and implementation. The African Development Bank's (AfDB) flagship Electricity Regulatory Index for Africa (ERI) will be one of the reference documents for this component, supporting the Bank's efforts to enshrine the ERI principles and indicators across the regions and ultimately to feed into continental monitoring frameworks.

This component will also support COMESA to elaborate and adopt a standardized comparative dataset of utility Key Performance Indicators (KPIs) that would be used to assess and track performance of utilities across the region and facilitate harmonized approach to incentive-based regulation across the region.

The scope of work under **Workstream 1** is as below:

i. Review of regulatory principles and practices
ii. Review of utility key performance Indicators used globally and, in the COMESA region
iii. Development of energy regulatory principles and key performance indicators (KPI)
iv. Development of evaluation framework for energy regulatory performance in the COMESA region
v. Refinement of utility KPIs and the KPI process
vi. Test and validate the two methodologies developed for tracking energy regulatory performance and utility KPI

Workstream 2 will be discussed and covered in a separate report.

1.2 Objective of Workstream 1

The overall aim of the regulatory work stream 1 is to promote the harmonisation of electricity regulation at the regional level to support cross-border power trades. This means not only ensuring a cohesive and harmonised regulatory framework adopted at the regional level and dealing with matters of regional power trade, but importantly it means the harmonisation of national laws and regulations with that regional framework. This will **'level the playing field'** for existing electricity operators, traders and investors, improve transparency, lower regulatory and political risk and help reduce administrative and regulatory barriers to trade and lower trading costs.

1.3 Key outcomes and results of Workstream 1

The Project seeks to provide tools for harmonizing regulatory frameworks to facilitate the smooth and timely completion, and utilization/operation of regional energy infrastructure.
The specific outcomes and results of Workstream 1 are expected to be:

- Harmonized regulatory frameworks in COMESA Member States
- Harmonized regulatory and utility KPI tracking framework
- Standardized Key Performance Indicators (KPIs) to facilitate harmonized approach to incentive-based regulation across the region
- Improved and secured energy data collection, storage and dissemination

1.4 Overview of the report

In accordance with the terms of reference, the *Framework Report on "Elaboration and Adoption of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI)"* for COMESA Member States is being submitted herein. This report is structured as follows:

Chapter 1: Introduction

This chapter provides a description of the project context, scope of work for workstream 1, objective, specific outcomes and structure of the report.

Chapter 2: Current regional and international electricity regulatory principles

This chapter talks about the international regulatory best practices particularly from the perspective of promoting regional wholesale electricity markets and also reviews the current electricity regulatory practices in the COMESA Member States to understand the gaps in the current electricity regulatory market.

Chapter 3: Recommended electricity regulatory principles and KPIs for COMESA region

This chapter provides the structure of the multi-parameter framework for evaluation of regulatory structure focusing on legal framework for the regulator, institutional structure, institutional capacity, governance, third party access, system efficiency, regulatory tools and processes.

Also, a list of key performance indicators and data assets have been described for comprehensive tracking of regulatory performance of Member States.

Chapter 4: Framework for evaluating regulatory practices and performance in COMESA region

This chapter provides the detailed methodology and an excel based template/model for annual data collection, analysis and evaluation (both qualitatively and quantitatively) of regional energy regulatory

practices/performance in the COMESA Member States. Additionally, the regulatory KPIs excel data collection format has also been talked about.

Chapter 5: Utility KPIs and Tracking Framework

In this chapter, a list of key performance indicators (KPIs) and data assets have been proposed for comprehensive tracking of utility performance of COMESA Member States. The excel based model for annual data collection, analysis and evaluation of the utility KPIs is also mentioned.

Chapter 6: Strategy and Action Plan for disseminating and implementing RERP, Regulatory KPIs and Utility KPIs across COMESA Member States

This chapter talks about the strategy and action plan for disseminating and implementing RERP, regulatory and utility KPIs across COMESA Member States.

Chapter 7: Summary and Conclusion

This chapter provides a summary of the entire framework and highlights the key outcomes/findings of the previous chapters.

2 Current regional and international electricity regulatory principles

2.1 Introduction

This chapter talks about the international regulatory best practices particularly from the perspective of promoting regional wholesale electricity markets and also reviews the current electricity regulatory practices in the COMESA Member States to understand the gaps in the current electricity regulatory market vis-à-vis the best practices. This lays the foundation for arriving at the Regional Electricity Regulatory Principles (RERP) which are discussed in the next chapter.

2.2 Analysis of regional and international electricity regulatory principles and practices

We have analysed international regulatory best practices that are relevant to the development of a regional electricity market. We have summarized the learnings from the following electricity markets:

- Europe
- United Kingdom (UK)
- United States

2.2.1 Europe

The organization and regulation of the energy sector in Europe is the result of a long process of implementation with one ambition: to create **competitive, regional markets for electricity and gas**. For the Member States, it is a matter of going beyond national rationales to establish a coherent organization across borders. This dynamic was launched in 1996 with the adoption of the first European directive on the internal market for electricity, followed shortly by the corresponding directive on gas. European law, as set out in the Directives, has gone through cyclical reforms over the intervening 30 years to create **competition in the power and gas markets** and, as a means to this end, to enhance regulatory independence and authority, unbundle the sectors (especially networks from generation / supply) and strengthen third party access provisions.

Although the principle of a single internal market for electricity was established from the outset, the first texts were much less prescriptive than those that followed. Regulatory guidelines are generally subject to the EU's energy policy objectives, which have three dimensions: *competitiveness, security of supply and sustainability*. The relative importance of these dimensions may vary according to the context.

Principles laid down by the first European directives

When the first European directives were drawn up, several major principles were put forward, such as guaranteeing security of supply, ensuring the competitiveness of supply, and ensuring the fulfilment of public service missions and environmental protection. In addition to the general improvement of economic efficiency, the European Commission expected the creation of the internal energy market to lead to greater transparency. The approach advocated by the European Commission included the following aspects:

- The changes must be gradual to allow the industry to adapt

- The application of the principle of subsidiarity: Member States can opt for the system best suited to their situation
- Avoiding excessive regulation
- Promoting dialogue with stakeholders (public consultations, hearings, consultation workshops)

In terms of content, the first directives (96/92/EC for electricity and 98/30/EC for gas) initially focused on adapting national frameworks to competition based on a still vague market model. To this end, priority was given to the **restructuring of incumbent operators, with the creation of network operators, first through accounting separation and then through the establishment of independent companies** (which today constitute the governance model for electricity and gas transmission networks). In addition to **unbundling**, the application of a new market model has involved several projects, including the definition of network access rules and the implementation of mechanisms to ensure a match between supply and demand.

As far as consumers are concerned, the 1996 and 1998 directives established a gradual opening of the market. The 2003 directives imposed a total opening of the market on July 1, 2007.

The deepening brought by legislative packages

Gradually, the approach has evolved towards a strong convergence of the rules applied at member state level. The 2003 directives aimed first and foremost to strengthen the **independence of network operators** and established the **obligation to create regulatory authorities in all Member States**. The 2003 directives also introduced the objective of allowing all consumers to choose their supplier, regardless of their level of consumption, as of 1 July 2007.

Noting the obstacles to cross-border trade caused by differences in the rules applied at the national level, the European Commission adopted[1] the principle of European network codes, i.e. **harmonized rules** for the operation of electricity and gas systems in order to promote their integration. The third legislative package[2], adopted in 2009, marked a decisive step in the creation of the internal market. The texts adopted first established **ownership unbundling** as the reference model for unbundling. This model prohibits any company with production or supply interests in the energy sector from controlling a transmission system operator. Being a shareholder can be tolerated if it can be proven that there is no ability to influence the operator's choices. However, two other models have been added: the independent network operator (ITO) and the independent system operator (ISO).

At the same time, wholesale markets were set up, often at the initiative of transmission system operators, who offered an interface between the network (the physical part of transactions) and the contractual sphere, operated bilaterally by brokers or exchanges. This was the beginning of electricity and gas trading, which is now at the heart of the market models implemented (market coupling in the electricity sector, hub-to-hub model in gas).

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1 *First developed by the regulatory OFGEM in the UK in 1989 for electricity and then adopted by OFGAS in 1995 for natural gas.*

2 *Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity, Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas, Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators.*

The principle was to remove the obstacles to cross-border energy exchanges through the development and implementation of European network codes and guidelines, in the form of regulations.

The most recent regulation in Europe

Directive (EU) 2019/944 concerns common rules for the internal market in electricity. It revises and replaces Directive 2009/72/EU and sets out rules for the generation, transmission, distribution, supply and storage of electricity. It also addresses consumer protection aspects to create integrated, competitive, consumer-oriented, flexible, fair and transparent electricity markets in the European Union (EU). It applies from January 1, 2021.

The directive therefore contains rules for the retail electricity markets, while Regulation (EU) 2019/943, adopted at the same time, consists mainly of rules for the wholesale market and network operation. It applies from 1 January 2020.

Both the regulation and the directive are relevant to the **principles of good regulation** that apply in Europe. While the Directive focuses largely on consumer rights in the retail market - which basically implies a rather mature market characterized by competition and a sophisticated level of technology - it also addresses important aspects in the wholesale market: access to data, obligations and independence of distribution system operators and transmission system operators, and energy regulators.

The Directive sets out the rules applicable to the wholesale market, the most relevant of which are:

- National energy regulators must cooperate with neighbouring regional regulators for the smooth functioning of cross-border trade. They must also monitor regional operating centres
- Non-discriminatory data access from smart metering systems that respect data protection rules
- Distribution System Operators (DSOs) must be independent (if part of a vertically integrated company) and are responsible for the long-term capacity of the grid and must respond to demands for electricity distribution (including to integrate new renewable installations). They must operate in a transparent manner, providing the information required to allow grid users to access the grid efficiently and publishing plans for the development of investments over the next five to ten years. Compliance Officers must be appointed, with direct reporting lines to Board level and to the regulator, and a Compliance Plan must be approved by the regulator.
- Transmission system operators (TSOs), like distributors, are generally not allowed to have or operate storage facilities. In addition, like any TSO, they must manage the operation of the network (maintaining the balance between supply and demand) and must ensure the long-term capacity of the network in close cooperation with neighbouring DSOs and TSOs

Regulation 2019/943 on the other hand is relevant to consider aspects of an efficient wholesale market because it ensures an efficient, competitive, and undistorted market. It also supports the **decarbonization of the sector and the removal of barriers to cross-border electricity trade**. The regulation sets out several principles by which electricity markets should operate, including:

- Encouraging free price formation and avoiding measures that prevent price formation based on supply and demand
- Facilitating the development of more flexible generation, low-carbon generation, and more flexible demand
- Empowering consumers to be actors in the energy market and in the energy transition

- Enable the decarbonization of the electricity supply system, including promoting the integration of electricity generated from renewable energy sources and providing incentives for energy efficiency
- Provide incentives for investment in generation, in particular long-term investment in a sustainable, low-carbon electricity supply system
- Facilitate the gradual removal of barriers to cross-border electricity flows between bidding areas or EU countries and to cross-border transactions in the electricity and related services markets
- Enable the development of demonstration projects for sustainable, secure, low-carbon renewable energy technologies or networks to be implemented and operated for the benefit of society.

The Regulation states that for capacity management and network access, EU countries must take appropriate measures to address congestion and therefore "bidding zones" (areas for submission of offers) must be defined in a way that ensures market liquidity, effective congestion management and overall market efficiency.

2.2.2 United Kingdom (UK)

The British electricity and gas market has been open to competition since 1990. The Electricity Act (1989) profoundly changed the organization and operation of the electricity sector by **introducing competition** and **privatization of the incumbent companies**. This major restructuring resulted in a policy of vertical fragmentation and horizontal devolution:

- Abolition of monopolies in the production and sale of energy
- **Vertical unbundling** of the competitive businesses vis-à-vis the monopoly links[3]
- Universal eligibility of consumers (staggered over 8 years from 1990 to 1998[4]) and regulated Third Party Access to the Networks
- Complete vertical disintegration of the three GB Transmission System Operators
- Creation of an organized wholesale energy market (made mandatory for all power plants over 50 MW) in England and Wales, with a bilateral market in Scotland[5], and
- Supervision of the sector by an **independent sector regulator**

In 2000, a vast reform project resulted in a law called the "Utilities Act" (2000). This law reformed the "Pool" in favor of a series of non-mandatory bilateral markets (short, medium, and long term) and a centralized variance settlement mechanism (aimed at ensuring the stability and security of the network). The new auction rules and price determination process were designed to reduce the risk of manipulation by dominant operators in the pool. These "New Electricity Trading Arrangements" (NETA) came into force in 2001 and became "BETTA" (British Electricity Trading Transmission Arrangements) in 2005.

The Utilities Act (2000) also led to the separation of supply and distribution and was followed by the Energy Acts relating to support for renewable energy and **unification of the wholesale market** (2004, 2008, 2010 and 2011). Most electricity market transactions are now conducted over the counter (OTC) and the rest on power exchanges, managed by N2EX, Epex Spot, and the Intercontinental Exchange (ICE).

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[3] *Certainly, for the England & Wales market; the Government privatised the two Scottish companies on a vertically integrated basis as a matter of necessity, as the smaller of the two, Scottish Hydro-Electric plc required an internal cross-subsidy between its low-cost hydros and its prohibitively high-cost transmission and distribution networks. At the date of privatisation, the generation business paid 19 million British pounds to Transmission and 40 million British pounds to Distribution. The 'hydro benefit' mechanism was modified over a decade ago and replaced by a GB wide subsidy mechanism.*

[4] *In 1990: 1MW and above; in 1994 100kW and above; full liberalisation in 1998*

[5] *In 1998 the two markets were coupled to form a single GB wide trading market*

The Electricity Act imposed a duty on the National Grid Company (NGC) to develop, maintain and operate the transmission system in an efficient, coordinated, and economic manner and to promote competition in generation in England and Wales. NGC must provide **non-discriminatory access at regulated prices**.

Both the wholesale and retail markets are fully open to competition.

The **Office of the Gas and Electricity Markets (Ofgem) is the independent tariff regulator** responsible for regulating the electricity and gas sector.

Ofgem's powers and functions are largely provided for in UK legislation (such as the Gas Act (1986), the Electricity Act (1989), the Utilities Act (2000), the Competition Act (1998), the Enterprise Act (2002) and the Energy Act (2004, 2008 and 2010)) as well as in European legislation. The duties and functions relating to gas are set out in the Gas Act and those relating to electricity in the Electricity Act.

Ofgem ensures that the gas and electricity markets operate in the **interests of consumers**: it sanctions abuses of dominant positions and cartels and ensures that market players fulfil the conditions of their operating license. Its first duty is to protect the interests of present and future consumers, if possible, by promoting competition, both about gas transported through gas pipelines and electricity transported through distribution or transmission networks. The interests of consumers are defined as all their interests, including their interest in reducing greenhouse gases and the security of their gas and electricity supply.

The Ministry of Energy is the Department for Business, Energy and Industrial Strategy (BEIS). It is responsible for the UK's long-term energy policy, including renewable energy. One of its tasks is to set targets for the UK electricity markets, but it does not regulate it or manage day-to-day electricity production. Indeed, it is a feature of the UK markets that even the regulator does not *regulate* the trading markets or production, apart from the grant of generation licences and following up on any anti-competitive behaviour, which is then referred to the competition authority, or any lack of liquidity in the trading markets. It is this latter role in monitoring the liquidity of the trading markets that has driven the continuous reforms of the trading arrangements described above. The UK Government and regulator have always followed the precept that regulation is a surrogate for competition. As the GB market is fully competitive, and has been designed to be since the outset, direct regulatory control is not required.

2.2.3 United States

The Federal Energy Regulatory Commission (FERC) is an **independent agency in the United States that regulates interstate transmission and wholesale sale of electricity**, the interstate transmission and wholesale of gas, the interstate transportation of oil by pipelines and reviews proposals to build interstate natural gas pipelines, natural gas storage projects, liquefied natural gas (LNG) terminals, and the licence for non-federal hydropower projects.

Enabling Legal Framework: FERC’s powers and responsibilities are granted by the Congress and are described in numerous laws including the Federal Power Act, Public Utility Regulatory Policies Act, Natural Gas Act and Interstate Commerce Act.

Key functions and powers: FERC’s regulatory mandate in the field of electricity covers interstate transmission and wholesale sale of electricity. As a horizontal objective FERC must exercise its functions and responsibilities as required in order to achieve that consumers have access to economically efficient, safe, reliable, and secure energy. The key regulatory responsibilities of FERC in the field of electricity comprise:

- Regulating the transmission and wholesale sale of electricity in interstate commerce
- Reviewing certain mergers and acquisitions and corporate transactions by electricity companies
- Reviewing applications for electric transmission projects under limited circumstances
- Licensing and inspecting private, municipal, and state hydroelectric projects
- Protecting reliability of the high voltage interstate transmission system through mandatory reliability standards
- Monitoring and investigating energy markets
- Enforcing FERC regulatory requirements through imposition of civil penalties and other means
- Administering accounting and financial reporting regulations and conduct of regulated companies

Key Regulatory and Enforcement Instruments: The key regulatory instruments that FERC has at its disposal to carry out its responsibilities are industry-wide decisions (i.e. through adoption of new statutes, regulations or rules) and party-specific orders. While FERC generally aims at encouraging compliance with such statutes, rules and orders, it also has a series of robust instruments at its disposal to enforce them in case of some form of fraud or market manipulation, anti-competitive conduct, serious violations of the electric reliability standards or conduct that threatens the transparency of regulated markets is detected. Enforcement instruments include the imposition of compliance commitments, disgorgement (repayment) of unjust profits resulting from the violations and civil penalties.

Governance/Organizational Framework: The organizational structure of FERC is headed by a Commission that is appointed by the US President with the consent of the Senate for a maximum term of five years. This Commission comprises up to five commissioners and coordinates the work of twelve offices that deal with the day-to-day implementation of the responsibilities and tasks of the FERC.

This is one of the best practices to have an independent regulatory body to regulate and monitor interstate transmission and wholesale sale of electricity.

2.2.4 Summary of the best practices

Basis the review of the practices adopted in developed economies of the world and considering the present regional context, following is the summary of the best practices:

- Europe has adopted the practice of having independent regulatory bodies in all Member States
- **Gradual approach to unbundling** was adopted in European market, beginning with accounting separation and then moving onto higher degrees of unbundling and at the end to the level of ownership unbundling
- European Commission adopted[6] the principle of European network codes, i.e. **harmonized rules** for the operation of electricity and gas systems in order to promote integration at the regional level
- European markets encourage providing incentives for investment in generation, in particular long-term investment in a sustainable, low-carbon electricity supply system
- UK has set up OFGEM as **the independent tariff regulator** responsible for regulating the electricity and gas sector
- UK has established a system of **regulated third party access** to the network
- UK also adopted the model of vertical unbundling

[6] *First developed by the regulatory OFGEM in the UK in 1989 for electricity and then adopted by OFGAS in 1995 for natural gas.*

- Creation of an organized wholesale energy market (made mandatory for all power plants over 50 MW) in England and Wales, with a bilateral market in Scotland
- United States has set up Federal Energy Regulatory Commission (FERC) - an **independent agency that regulates interstate transmission and wholesale sale of electricity**

2.3 Current electricity regulatory practices in COMESA Member States

Amongst the 13 countries which are the subject of our study, only seven countries have operational independent regulatory bodies namely: *Burundi, Egypt, Ethiopia, Kenya, Rwanda, Sudan and Uganda*. The remaining six countries - Djibouti, Eritrea, Libya, Somalia, South Sudan and Tunisia either do not have a regulatory body or it is not yet operational. The Ministry with portfolio responsibility for energy in the respective countries is carrying out the de facto role of a regulator for the power sector in these countries.

Countries with independent regulatory bodies also have well-defined legal and regulatory framework governing the electricity sector in these countries.

There is wide variation in the degree of independence of the regulatory bodies. Some countries with regulatory bodies in place still do not have functional independence of the regulator – with all key decisions requiring the Ministry's approval. This is the case in point in countries - Burundi, Ethiopia and Sudan. The way in which the regulators are funded also varies from fully state-funded to fully funded by industry licence fees.

Somalia and South Sudan are also taking steps towards setting up independent regulatory bodies. In Somalia, National Electricity Authority (NEA) has been recently established and is yet to be operationalized. In South Sudan, a bill has been proposed to set up a regulatory body.

Key observations pertaining to the market structure of the Member States are as:

- Fully separated accounts: Egypt, Sudan, Uganda
- Partially separated accounts: Ethiopia, Kenya. Accounts of KENGEN and KETRACO are fully separated; However, KPLC carries out both transmission & distribution activities. In the case of Ethiopia, Ethiopian Electric Power (EEP) carries out both generation and transmission activities (> 66 kV). Ethiopian Electric Utility (EEU) manages electric power distribution and the operation of power transmission lines of ≤66 kV within the national power grid
- No separation of accounts: Burundi, Djibouti, Eritrea, Libya, Rwanda, and Tunisia
- Isolated grids, private operators: Somalia, South Sudan

So, it is observed that the Member States vary in the degree of unbundling. Complete unbundling at the generation, transmission and distribution level is observed in the case of Egypt, Kenya, Sudan and Uganda. Burundi, Djibouti, Eritrea, Libya, Rwanda, and Tunisia have vertically integrated utilities carrying out generation, transmission and distribution of electricity in the respective Member States.

2.4 Similarities and differences between current regulatory practices across COMESA region and benchmarking to international best practices

The 13 candidate states which are the focus of our study vary vastly in their size and geography. This has a significant impact on the resources - energy and human resources – available to governments and to the optimal size and structure of their different power systems.

The group includes countries that are very far apart in terms of power sector development. Egypt, Kenya and Uganda can be considered regional (if not continental) leaders in the implementation of power sector and regulatory reform, while others such as Somalia and South Sudan are only taking the first steps down the reform road.

Within the group are two states - Somalia and South Sudan – which do not yet have an integrated national grid – which makes interconnection with other states in the region difficult. These states are managed by private isolated distribution systems.

The countries with independent regulatory bodies namely *Burundi, Egypt, Ethiopia, Kenya, Rwanda, Sudan and Uganda* are also seen to have well-defined legal and regulatory framework governing the electricity sector in these countries. However, complete regulatory independence is amiss in some countries as all key decisions require the Ministry's approval. This is the case in point in countries - Burundi, Ethiopia and Sudan. The way in which the regulators are funded also varies from fully state-funded to fully funded by industry licence fees.

The remaining six countries - Djibouti, Eritrea, Libya, Somalia, South Sudan and Tunisia either do not have a regulatory body or it is not yet operational. The Ministry with portfolio responsibility for energy in the respective countries is carrying out the de facto role of a regulator for the power sector in these countries. The respective department in the Ministry of Energy carries out the regulatory functions. This limits the bandwidth of exercising regulatory powers as the regulator is not an independent body.

The countries also vary in the market design of the electricity sector structure. Varying degrees of unbundling are observed in the Member States. Complete unbundling is observed in the case of Egypt, Kenya, Sudan and Uganda. Not all countries have well-defined third-party agreement frameworks in place even though TPA is allowed under the principal legislation. Likewise, not all Member States are observed to have grid code documents in place with the same amiss in Burundi, Djibouti, Eritrea, Libya, Somalia, South Sudan, Tunisia. Having a grid code and well-defined TPA framework are essential to set the ground rules for ensuring a holistic wholesale energy market environment. Somalia and South Sudan may be considered as exceptions to this as they are primarily operated by independent isolated grids and do yet have an interconnected national grid system in place.

Regulatory transparency remains a weak point across these countries and across Africa. Dedicated websites are not universal and where they exist are frequently under-utilised. One of the detailed features of the Harmonised Regional Regulatory Framework under the ESREM was the placing of all Board decisions in the public domain (minus any genuinely commercially confidential data). This is an essential factor in building investor confidence and in demonstrating that good regulatory practice is not just in the laws and regulations but is applied in actual practice.

2.5 Gaps in the current electricity regulatory practices in COMESA region

Based on the review of current electricity regulatory practices, following key gaps are observed:

- Sector structure (market design) - market concentration, single-buyer model, lack of accounting separation between generation, transmission and distribution operations and partial unbundling in most Member States
- Limited regulatory independence with exceptions being Egypt, Kenya, Rwanda, Uganda
- Lack of regulatory appeal process in most countries
- Lack of disclosure regarding much of the detailed regulatory framework on public domains for certain Member States such as Eritrea, Libya, Sudan, South Sudan
- Lack of well-defined third-party access frameworks and corresponding rules
- Absence of grid code documents in countries such as Burundi, Djibouti, Eritrea, Libya, Somalia, South Sudan, Tunisia
- Incomplete frameworks particularly at transmission level interconnection level
- Lack of good consultative practices and full regulatory disclosure and transparency

2.6 Conclusion

Regional and continental inter-state electricity trade depends on good infrastructure and an enabling regulatory environment. Different trading regimes, different laws, different market structures and a high level of political control and influence increase the risk premium for investors to invest in the market. For an investor in energy infrastructure, the greater the risks faced in any country, the higher the return that will be demanded, which impacts energy prices. Where the person who has the legal power to make the decisions impacting that investment and return is seen as impartial of government and existing sectoral operators and bound by statute to make decisions based on fact, the perceived risk to the investment is significantly reduced. As mentioned above, ensuring full transparency and disclosure of regulatory decisions (and the preparation of decisions through consultative processes) is what allows good practices to be seen as impartial.

Therefore, to develop the market further and attract capital investment, there is an overwhelming need to harmonize the regulatory frameworks amongst the Member States. This will also bring the states **one-step closer to the African Single Electricity Market (AfSEM) agenda and help in aligning the regulatory frameworks at the continental level.**

3 Recommended regional electricity regulatory principles and KPIs for COMESA region

3.1 Introduction

Noting the obstacles to cross-border trade caused by differences in the rules applied at the national level, harmonized Regional Electricity Regulatory Principles (RERP) are being proposed. A **uniform set of regulatory principles** is essential to steer Member States towards the development of a **consistent regulatory environment** across a significant part of the continent; in turn, this process will improve **regulatory certainty** both for public and private sector licensees and further strengthen States' ability to attract private sector capital.

The RERP have been finalised in consultation with the stakeholders. The principles were discussed as part of the consultative workshop at Cairo during 13-14th May 2024 and finalised subsequently during the validation workshop at Kigali during 30-31st July 2024. Field missions were undertaken to the to the **five select countries** - Egypt, Ethiopia, Rwanda, Tunisia and Uganda and inputs gathered have been integrated into these principles.

3.2 Identified core areas that should form part of RERP for COMESA region

Regulatory rigour, independence, non-discrimination, transparency, and efficiency are the core values of a robust regulatory framework. Several elements go into building these values, which pertain to regulatory structures, institutional capacity, governance, regulatory scope, rules, processes, and standards.

Construct of a robust regulatory framework which can be considered as a model is described in the table below.

Table 1: Construct of a robust regulatory framework

No.	Building block	Element	Importance
1	***Regulatory capacity***	1.1 **Regulator is constituted as a well-defined standalone legal entity**	Provides a distinct legal identity, thereby enabling organizational stability and independence
		1.2 **Regulator is well governed, independently**	Governance ensures adequate oversight and supervision. Independence ensures that the governance mechanism is not impacted by conflicting interests.
		1.3 **There is separation of roles between the Regulator's Board and its Management**	Ensures that the Board can provide effective oversight and supervision over the Regulator's Management.
		1.4 **Regulatory decisions can be appealed against**	Provides a mechanism for aggrieved parties to appeal against the Regulator's decision
		1.5 **Regulator can sustainably and independently generate income**	As far as possible, the Regulator needs to be self-sustaining in terms of its income and minimize reliance on Government funding. This is also critical to ensure long term sustainability of regulatory operations.
		1.6 **Regulator's income adequately covers its expenses**	Effective regulation requires expenditure on resources related to staff, professional expertise, infrastructure, IT systems, tools, etc. When income adequately covers these expenses, it ensures that a Regulator's reliance on Government funding is minimized, thereby enhancing its independence.
		1.7 **Regulator is adequately staffed to carry out required functions**	Regulatory functions cover legal, technical, commercial, financial, administrative and technology related aspects. This requires human resources with relevant domain knowledge, functional skills and behavioural traits. Adequate level of staffing is necessary to ensure regulatory duties are performed effectively.

No.	Building block	Element	Importance
2	***Regulatory powers***	2.1 **Only licensed operators are allowed across electricity subsectors** *Subsectors mean Generation, Transmission, Import, Export, Trading, Distribution, Retail supply*	Licensing provides a regulatory framework for electricity operations. It ensures reliability, quality, and safety of electricity supply is maintained by electricity operators.
		2.2 **Regulatory framework for Licensing exists and is comprehensively defined** *Comprehensive means covering license application and granting procedures, decision making factors, information submission requirements, license fees, form of license, licensee rights and obligations, adherence to technical compliance and performance standards, information reporting requirements, etc.*	A comprehensive licensing framework ensures rigor in licensing process and enforces compliance by licensees of the licensing terms and conditions.
		2.3 **Charges for licensed services provided across all electricity subsectors are subject to regulatory approvals**	Ensures charges for services provided are cost reflective, non-discriminatory and promote long term investments in the electricity sector.
3	***Rule-based system operations and access***	3.1 **Grid code exists** *Grid Code is a document (or set of documents) that legally establishes technical and other requirements for the connection to and use of an electrical system in a manner that will ensure reliable, efficient, and safe operation.*	An electrical system requires the System Operator and all System Users to function as per set rules and procedures, adhere to technical standards and closely co-ordinate with each other. The Grid code document/s codifies these aspects to ensure adherence.
		3.2 **Grid code is comprehensive** *Comprehensive means covering scheduling and balancing of power flows, outage planning, grid security, criteria for connecting, metering, data sharing and reporting obligations, cyber security, long term planning, performance standards, penalties*	A comprehensive Grid Code ensures rigor in adherence of the requirements and enforces compliance by System Operator and System Users.
		3.3 **Grid code governance is strong** *Grid code governance is considered strong when an independent body exists for taking key decisions and it has*	System Users, System Operator can conflict with regards to their respective performances. Hence a strong and independent governance mechanism is required which

No.	Building block	Element	Importance
		representations from all System Users	considers interests of all System Users.
		3.4 **Process for revising grid code is robust** *A robust revision process means any System User has right to propose the revision and an independent body (having representation from all System Users) is vested with deciding on the revision.*	Grid Code being akin to a sacrosanct document, any process of revising the Code needs to be robust.
4	***Transparency - Clear visibility of the electricity value chain***	4.1 **System Users have a clear understanding of the electricity value chain cost structure**	Clear understanding of the costs involved in generating, purchasing, transmitting, distributing, and selling of electricity enables operators and investors in short term and long-term decision making.
5	***Third Party Access***	5.1 **Third party access (TPA) is allowed under the Principal Legislation** *Principal Legislation refers to the legal instrument (Energy Act, Electricity Act or equivalent) which establishes the core and primary legal framework for electricity sector in the country.*	Providing TPA is the first step towards introducing competition in the electricity sector.
		5.2 **Wholesale power market is Competitive**	Ensures efficient price discovery for wholesale power, which constitutes almost 80-90% of the total cost involved in supplying electricity to end consumers.
		5.3 **The country is active in terms of electricity trading with other countries**	It is a tangible indicator which demonstrates outcome of steps taken by a country to provide access to its markets for and conduct trade with other countries.
6	***Level playing field***	6.1 **Charges for third party access (TPA) are non-discriminatory and transparent**	Ensures non-state-owned generators (private, whether located inside or outside of the country) are not discriminated against.
		6.2 **System operator is independent - none of the System Users have a controlling interest in the system operator.** *Controlling interest here means the power of one entity to*	This is to avoid any conflict of interest between System Operator and any of the System User.

No.	Building block	Element	Importance
		direct management of another entity, through ownership of shares or voting rights, partnerships, agreements, etc.	
7	***System Efficiency concerning TPA***	7.1 **TPA charges are cost reflective**	TPA charges should ensure cost recovery for the network service provider but at the same time should not be prohibitive to suppress third party use of system.
		7.2 **Grant of TPA for non-complex connection requirements is timely** *Non-complex means those connections which do not require detailed studies to be undertaken. As a corollary, complex connections are those which are either far away from network or require construction of high voltage sophisticated interconnection facility.*	TPA timelines should be clearly mandated and should be reasonable to ensure access is granted in a timely manner without any hindrances.
8	***Clear consumer rights***	8.1 **Consumers have a right to receive supply either through grid or off-grid connections**	Protects consumer rights to receive supply.
		8.2 **Well defined framework exists for consumers to get connected to an electricity supply system** *Well defined means the timelines to provide a new connection are specified and the Form of Contract is defined and approved by Regulator*	Ensures connections are provided in a timely manner and interests of utility and consumers are balanced.
9	***Integration of Renewable Energy***	9.1 **Grid code includes connection requirements for variable renewable energy-based power plants (VRPPs), particularly wind and solar.** *For VRPPs, connection requirements cover fault (voltage) ride-through, frequency ride-through, ability to control active power output, reactive power output and frequency as per the system operator instructions.* *Fault ride-through refers to the ability of a generator to remain connected for a particular time interval during a system voltage disturbance.*	Due to variable and non-dispatchable nature of their output, special conditions need to be specified for VRPPs to promote stable and safe operations of the grid. By specifying such conditions, VRPPs have a clear understanding of the investments they need to make in installing the necessary control equipment to ensure compliance with grid standards.

No.	Building block	Element	Importance
		Frequency ride-through refers to ability of a generator to remain connected for a particular time interval when system frequency deviates beyond a certain band.	
		9.2 **A well-balanced contracting framework exists for RE generators** *This means: i) standard PPAs are provided by Regulator covering the generator technologies prevalent in the country, ii) utility Buyer is obligated to contract using standard PPA, and iii) any deviations are to be pre-approved by Regulator.* *The standard PPAs shall be well-balanced. This means the contract structure shall provide balance between Buyer and Seller in terms of obligations to generate technically sound energy and make full payments in timely manner, termination rights, force majeure, legal jurisdiction of a neutral territory, inclusion of dispute resolution mechanism which is as per international laws, etc.*	Ensures balancing of interests and mitigation of risks for renewable energy projects and provides a standard template for executing power purchase contracts.

3.3 Recommended RERP that should be adopted and promoted in the COMESA region

The Regional Electricity Regulatory Principles (RERP) espouse regional regulatory principles that can be applied as a tool for regulatory peer-reviews in the region to track progress of adoption and implementation of the Member States towards harmonized principles. The RERP are being proposed under the following groupings:

1 Regulatory capacity - existence of an independent regulator operating under good governance rules

2 Regulatory powers - including tariff setting and licensing

3 Rule-based system operations and access - regulatory approval of a standardized grid code

4 Transparency - clear visibility of the electricity value chain

5 Third party access (TPA)

6 Level Playing Field - regulated TPA charges; presence of a licensed system operator as a ring-fenced function

7 System Efficiency concerning TPA - cost reflective and timely grant of TPA

8 Clear Consumer Rights

9 Integration of renewable energy - clear provisions for RE generators, including access, use of system and dispatch

It is to be noted that **each of the RERPs are intertwined to the twin principles of regulatory certainty and attracting investment.** Regulatory certainty leads to greater private sector investment and investment without regulatory certainty is not sustainable. Each of the RERP are discussed in detail in the following paragraphs.

3.3.1 RERP 1: Regulatory capacity - Independent and well-governed regulator

Clear statutory delegation of decision-making powers to an **independent, impartial statutory body** is essential to ensure that private sector investment is secured in the public interest (i.e. not to further any private or political interest). A strong regulatory regime makes it easier to attract investment from the private sector – alone or in partnership with the State.

Private investment in the long-term public interest requires

- ✓ Stable, transparent, legitimate regulatory regime based on clear statutes and secondary legal instruments
- ✓ Assurance that regulatory decisions will be impartial and fact-based (and can be seen to be so)
- ✓ Ability to challenge adverse regulatory decisions without unreasonable cost, delay or uncertainty
- ✓ Visibility and predictability of how revenues will be determined, and profits secured and, where appropriate, exported
- ✓ Assurance of a 'level playing field' – i.e. the same rules apply in fact (as well as in law) to everyone and there is a guarantee of non-discriminatory access to the monopoly services
- ✓ Transparency over the rights and obligations of the investor within the market

✓ Transparency over the rights and obligations of the network operator(s)

The role of a good regulator should be to foster the transparency required of an efficient market, enforce market regulations and promote competition in the ultimate interest of consumers and operators.

Also, from a wholesale market perspective, the market must:

- Balance supply and demand
- Minimize transaction costs
- Produce prices that reflect the economic and marginal costs of production
- Provide signals for investment in a sustainable manner

Therefore, having a **strong, efficient and an independent regulator is a must in a wholesale electricity market**.

This principle comprises the following key aspects:

- Regulator is constituted as a well-defined standalone legal entity
- Regulator is subject to clearly defined statutory good governance controls and has financial, decision-making and management[7] independence
- Separation of roles between the Regulator's Board and its Management
- Regulatory decisions can be appealed against
- Regulator can sustainably and independently generate income
- Regulator's income adequately covers its expenses
- Regulator is adequately staffed to carry out required functions

Further, elaboration of some of the international best practices in this regard is as shown in the box items below.

[7] *By 'management' we refer here to the ability to determine the programme of work, the budget necessary to deliver it, as well as the freedom to recruit the staff and procure other resources that are necessary for full discharge of the regulatory mandate. Governmental control over any of these three forms of independence tends to weaken the regulator and render it ineffectual*

Financial independence of the regulator – International best practice

- A duty to develop its program of work in line with its statutory mandate and functions and without prior approval by government elected official
- The right to set the budget necessary to allow it to discharge its functions with only post-facto controls by national audit function or parliament; its statutory mandate is recognized, and full operations are assured
- The law specifies the principle of a **regulatory levy on licensed operators** under full regulatory control; publishes its methodology and forecast values of levy; there is a consistent recovery of levy from operators
- Funds from the operator levy are remitted directly to regulator-controlled bank account
- The regulator has a duty to submit accounts maintained in line with generally accepted or nationally applicable accounting practices to national audit in line with statutory requirements for independent public regulatory bodies
- Reports on its expenditures and incomes published and justified with clear reference to discharge of statutory mandate

Independence of the Board - International best practice

The national law makes clear provision to ensure that:

- The national law makes clear provision to ensure that individuals within the regulator that hold statutory authority are impartial and independent of government
- Individuals within the regulator that hold statutory authority are appointed following a public, competitive and transparent recruitment process administered by an impartial body that is not influenced by elected public officials prior to nomination from a short list of qualified applicants
- Nominations are drawn only from people having met transparent and non-discriminatory criteria that are balanced and appropriate for the skills and experience required
- Other individuals within the regulator are also appointed following a public, competitive and transparent recruitment process administered by an impartial process or by the regulator itself that is not influenced by elected public officials prior to nomination from a short list of qualified applicants
- Short lists and nominations for all regulator members/officers are based on merit and take no account of affiliations or interests that might militate against impartiality in the appointee opinions, actions and decisions
- All appointments are made without influence or instruction from elected public officials

Appeals body – International best practice

The putting in place of **some form of appellate route for disputes between operators or between an operator and the regulator makes a significant difference to the risk profile of any national electricity market.** Investors perceive risks in unfamiliar legal systems: cost; concerns over weak judiciaries; inherent bias or corruption; uncertainty over access to good and unbiased national lawyers and barrister or their equivalent in different countries. Seeking justice in the Courts is therefore viewed very negatively. International commercial arbitration overcomes almost all these problems but is extremely expensive and is also a long process. It does have the benefit of confidentiality, but for smaller investments or sums in dispute, it can be prohibitively expensive. **A tribunal which is adapted to economic and technical disputes can provide a cost-effective, risk-reducing solution.** This could be as simple as a 'second look' review within the regulatory body, such as in Tanzania or an external body such as a competition adjudication body.

3.3.2 RERP 2: Regulatory powers - Licensing

As market arrangements develop, and new instruments are created, a multiplicity of different duties, tasks, obligations and rights are created - and sometimes modified. **A licence is a permit to undertake specific energy activities.** The licence is the core document that binds all of these rights and obligations together in terms of compliance.

Licensing provides a regulatory framework for electricity operations. It ensures reliability, quality, and safety of electricity supply is maintained by electricity operators. A licence includes **statement of grant (the licence) and term (duration) plus conditions**. It is the **conditions** that are the important part – breach of these may give cause to terminate or suspend the licence, halting operations.

Because licences are so critical to the ability to operate, it is standard international practice for any modification in the same to be subject to some restrictions (consultation, furtherance of objectives of primary law) by the regulator and for some conditions to be subject to appeal (such as price controls).

The licence should also set down clearly (and add to) the rights and duties of the regulator vis-à-vis the licensee.

When the sector is opened to competition, the licence of the incumbent operators become essential documents for new entrants. The **duties** of the licensee contained in the licence may translate directly to the **rights** of other licensees (e.g. duty to ensure transparent and non-discriminatory third-party access to the networks, duty to provide a connection quotation within three months etc.)

Both licences and any bylaws/regulations must be tied together - the licence should expressly require compliance with other regulations notified by the regulator. Licensing involves different phases ranging from issuing licences, determining the terms of reference, monitoring compliance to imposing sanctions and fines.

This principle comprises of the following three key aspects:

- Only licensed operators are allowed across electricity subsectors[8] (subsectors here means generation, transmission, import, export, trading, distribution, retail supply)

[8] *Subject to a de minimis threshold for very small operations, particularly in generation where purely auto-generation may be excluded from the licence obligation; other small operations (distribution / supply may still be subject to licensing, but with less onerous conditions.*

- Regulatory framework for licensing exists and is comprehensively defined - this means covering *license application and granting procedures, decision making factors, information submission requirements, license fees, form of license, licensee rights and obligations, adherence to technical compliance and performance standards, information reporting requirements, etc.*
- Charges for licensed services provided across all electricity subsectors are subject to regulatory approvals

Licensing procedures – International best practice

The State has:

- established clear and simple criteria for eligibility for grant of a licence which are fixed in primary legislation and are consistently applied
- fixed a clear process either in primary or secondary legislation for the application, evaluation and grant of licences which is under the authority of the regulator and is followed and applied in a consistent and transparent manner
- set rules for exemption from the requirement to hold a licence for classes of operator by virtue of their small size and low risk to the network
- set maximum terms for licence validity that are either evergreen (continue until terminated) or are of sufficient duration to allow continuous business operation for the expected life of the assets and renewable at the request of the operator
- created termination provisions in primary law that ensure that licences cannot be terminated, except at the operator's request, except on the grounds of bankruptcy or financial insolvency, or material breach by the operator of applicable laws which has not been, or is not capable of being, remedied
- granted power to the regulator to modify licences with the consent of the operator and any proposal to modify is capable of appeal
- empowered the regulator to standardize the obligations and rights that are applied to different classes of licensee as a condition of the grant of the licence and standardized model licences are published by the regulator
- taken all necessary steps to ensure that the obligations and rights that are applied to the licensee as a condition of the grant of the licence are embedded within the licence document awarded to the applicant and made public by the regulator on its website
- taken all necessary steps to ensure that the rights of the operator in respect of regulated charges are embedded within the licence or by reference to secondary legislation
- taken all necessary steps to ensure that the regulator may impose special conditions on licensees only in circumstances where this is necessary to promote competition and a level-playing field, or by reason of the uniqueness of the regulated activity permitted (such as system control)

3.3.3 RERP 3: Rule-based System Operations and Access - Presence of an Efficient Grid Code

A grid code is a collection of the mandatory technical parameters for planning, connecting to and operating the HV network – binding on all persons physically connected – and on the person who controls the system real-time. The grid code is approved by the regulator from time to time, and any modification requires re-approval. Users of the grid code should have a say in the management, application and modification of the grid code. This principle has been further sub-divided into the following four key aspects:

- Grid code - exists or not
- Grid code is comprehensive
- Grid code governance is strong
- Process for revising grid code is robust

A comprehensive grid code means one *covering scheduling and balancing of power flows, outage planning, grid security, criteria for connecting, metering, data sharing and reporting obligations, cyber security, long term planning, performance standards, penalties.* Grid code governance is considered strong when an independent body exists for taking key decisions and it has representations from all users. A robust revision process means any System User has right to propose the revision and an independent body (having representation from all System Users) is vested with deciding on the revision of the grid code.

In order to move towards regional integration and enhance cross-border trade, all countries should strive to have a comprehensive grid code document in place. The grid code (like the distribution code) is one of the few power sector regulatory instruments that can be 'copied' almost verbatim from system to system, with only the specific standards and operating parameters being subject to change between different power systems to reflect specific technical limitations on the grid.[9]

3.3.4 RERP 4: Transparency - Clear visibility of the Electricity Value Chain

This principle covers the "Transparency" aspect of the electricity value chain. This principle captures the level of functional unbundling and the corresponding **separation of accounts of at least generation, transmission and distribution activities**. Ideally, transmission should be separated in at least accounting and management terms into transmission system operation, network operation and, if relevant, market operation, and distribution should be similarly separated into network and commercial (retail supply) functions. The commercial functions (and indeed the entire sector) will also benefit from management separation to ensure there is adequate focus on the efficient and effective revenue cycle management.

An unbundled market structure is critical for transparency since it facilitates accounting separation and reporting of costs by nature of activity and allows light to fall on any potentially anti-competitive practices, such as the 'sheltering' in a monopoly business of some of the costs of an activity that is subject to competition, thus artificially lower the latter's cost of service. This allows investors to understand the cost buildup across the electricity sector value chain and make informed decisions; it builds confidence that the playing field is genuinely level; and it also allows more accurate determination of the cost of service and facilitates transition towards cost reflective tariffs.

[9] *Indeed, the grid code was first developed in a standardised form in the UK by the regulator to ensure that there was harmonisation across then three separate UK grid systems. That same format is used today throughout most of the Anglophone world.*

Transparent market structures are likely to attract more private investors. Publishing of **annual reports** by both regulator and system (and, where relevant market operator) increase visibility and confidence amongst consumers and other system users.

Unbundling is also the first step towards the introduction of **true competition** in power markets. From the comparative assessment of the countries, it emerges that although all countries have introduced competition in the generation function in the form of independent power producers (IPPs) (even the bundled ones), true competition is only possible when the generation and commercial functions are unbundled from the network functions[10] and both public as well as private sector investors are able to compete on a **level playing field**.

"Unbundling" means the separation of different aspects of electricity activity down the supply chain in order to ensure that there is a level playing field for competition and investment. There are four degrees of separation, each giving progressively greater assurance that barriers to competition are being eliminated:

Analysis of the costs of each component of the electricity supply chain requires good accounting separation (see box left), whereby the costs (including shared or corporate costs), revenues, assets and liabilities are hypothecated to different electricity activities as though each separate activity were a stand-alone 'business'. However, having created accounting separation, there is much to be gained by introducing a degree of management separation, particularly between generation and networks, and between supply and distribution, as it allows 'business' managers to focus on improving the performance of individual businesses rather than being distracted by the corporate whole. As the market develops, further degrees of separation are likely to be required.

3.3.5 RERP 5: Third Party Access

Third party access or TPA involves providing access to other users - generators and other network operators - to connect to and use the transmission and distribution networks in any given country. This principle has been further sub-divided into the following key aspects:

- Third party access is allowed under primary legislation
- Wholesale power market is competitive - multiple sellers and multiple buyers are permitted
- Level of electricity trade with other countries (share of imports and exports in electricity generation)

Permitting TPA is the first step towards introducing competition in the electricity sector. The presence of **multiple sellers and buyers in the market ensures efficient price discovery for wholesale power**, which constitutes almost 80-90% of the total cost involved in supplying electricity to end consumers. Only the largest power systems may have 'space' for multiple operators, but there should at least be no in-built barrier in any system that acts as a constraint on new entrants.

3.3.6 RERP 6: Level Playing Field – Regulated TPA charges and presence of independent system operator

This principle covers the following two aspects:

- Charges for TPA are non-discriminatory and transparent and approved by the regulator

[10] *This is not relevant in small isolated systems where access is the objective rather than competition*

- System operator is independent - none of the system users have a controlling interest in the system operator.

The above points are discussed below.

Non-discriminatory and transparent TPA charges

Some general guiding principles for increasing market access involves:

- Not only must the market arrangements prohibit discriminatory treatment for IPPs accessing the market, but they must be seen to be applied in practice
- For generators, access to the market involves:
    - being connected to the physical system
    - being dispatched to run
    - being paid for energy delivered
- The treatment of all plants in the system should be same

This ensures non-state-owned generators (private, whether located inside or outside of the country) are not discriminated against.

Independent system operator

The presence of an independent system operator is essential to avoid any conflict of interest between the system operator and any of the system users.

The **development of interconnections is driving a need across the continent for clear separation of system operation** (control room switching, controlling, balancing, coordination and constrained dispatch) from network operation (transmission line operations and maintenance) and market operations (economic dispatch). **Separation of control is desirable** (i.e. where the person who has the controlling interest in generation and supply does not have any controlling interest in the system operator). This lies in the future for many countries in the continent due to concerns of loss of control of strategic assets[11].

To give an example, the ownership unbundling adopted in European countries is a model that prohibits any company with production or supply interests in the energy sector from controlling a transmission system operator. This is an essential condition of unbundling in European markets.

[11] *The ownership structure of the state-owned electricity operators can be problematic. System operation (or combined system and market operation) is ideally ring-fenced from all other activities. It is ideally a separate legal entity from the rest and - again ideally - in different ownership from the rest of the sector. The current situation in Europe may be of interest for the future on the African Continent: transmission system operators (both power and natural gas) must be 'certified' by the national regulator (with a no objection from the EU) to confirm that no entity that controls generation or supply controls the TSO. Where the owner is the State, this has led to the curious compromise solution of having TSO 'controlled' by one Ministry, and other State operators controlled by a different ministry. All this is because one country in particular refuses to countenance private sector participation in transmission.*

Reducing anti-competitive distortions through an independent system operator

The electricity supply chain was traditionally considered to include four links: generation, transmission, distribution and supply. Modern power markets find it helpful to break down the transmission function further, recognizing:

- Transmission network operations – activity relating to operation and maintenance of the physical assets
- Transmission system operations – the central coordination and control of the interconnected circuits, constraint management and dispatch
- Market operations – the development of unconstrained generation schedules and the settlement of energy bought and sold

By identifying and correctly allocating the costs, revenues, assets and liabilities associated with each of these individual activities, the revenue requirement of each function can be better understood and managed. Importantly, when one or more activity in the supply chain is open to competition, investors can be assured that the operating and capital costs of their competitors are calculated on the same basis and according to the same principles as their own. This is particularly important given the degree of vertical integration in the sector, which creates an incentive to 'shelter' costs of competitive activities such as generation, by allocating them to the non-competitive parts of the business, artificially lowering their cost of generation and increasing their standing in the merit-order dispatch.

3.3.7 RERP 7: System Efficiency concerning TPA

This principle covers the following two aspects:

- Cost-reflective TPA charges
  - Network access charges are reviewed at least once every year[12]
  - Charges are based on an in-depth assessment of network operating, capital and financing costs and planned investments, carried out by the regulator at least once every five years
  - A regulator-approved methodology to determine the charges is well-defined and cost reflective, and kept under review
- Grant of TPA for non-complex connection requirements is timely

The underlying guiding principle while setting TPA charges is that they should ensure cost recovery for the network service provider but at the same time should not be prohibitive to suppress third-party use of system. The best practice approach involves that network access charges are reviewed atleast once every year; the methodology to determine the charges is well-defined and cost reflective.

TPA timelines should be clearly mandated and should be reasonable to ensure access to the grid is granted in a timely manner without any hindrances.

[12] *The precise nature of the review will depend on the overall model adopted for economic regulation. If a good multi-year price review is conducted leading to maximum allowable revenue (MAR) provisions for, say, five years ahead, with automatic annual adjustments for inflation, forex, etc. matched with a detailed set of charging principles and a clear statement of the methodology by which charges will be calculated, then the resulting annual network charges may be made and published with only prior notification to the regulator. The regulator simply checks that the prices are calculated on the basis of the MAR and the approved methodology.*

3.3.8 RERP 8: Clear Consumer Rights

Safeguarding consumer rights is the basic essence of a good regulatory regime. This principle covers the following two aspects:

- Consumers have a right to receive supply either through grid or off-grid connections
- Well-defined framework exists for consumers to get connected to an electricity supply system

The first aspect protects consumer rights to receive supply. The second aspect concerns the timelines to provide a new connection and the Form of Contract being defined and approved by the regulator. This ensures connections are provided in a timely manner and interests of the utility and consumers are balanced.

3.3.9 RERP 9: Integration of renewable energy - Clear provisions for renewable energy (RE) generators

Ensuring that security of supply is not bought at the expense of the environment

This is a major factor in African energy delivery for many reasons including international climate change obligations. Dependence on thermal (diesel) power usually brings high exchange rate risk and makes electricity unaffordable to many citizens; renewable energy systems are better adapted to distributed generation and for meeting electrification targets; and much baseload generation could be constructed to harness renewable sources – water, biomass, wind, solar and geothermal, which continental Africa possesses in abundance. To fully enable renewable energy use, resources need to be mapped, projects identified, and renewables integrated into the planning process. On the legal and regulatory side, laws should be developed to give **appropriate incentives to boost the use of renewable energies.**

This principle covers the following two aspects:

- the Grid Code includes connection requirements for variable renewable energy-based power plants (VRPPs), particularly wind and solar
- a well-balanced contracting framework exists for RE generators

Due to the variable and non-dispatchable nature of their output, special conditions need to be specified for VRPPs to promote stable and safe operation of the grid. By specifying such conditions, VRPPs are given a clear understanding of the investments they need to make in installing the necessary control equipment to ensure compliance with grid code standards.

The second aspect of this principle means that:

i standard PPAs are provided by regulator covering the generator technologies prevalent in the country,
ii the utility buyer/s is/are obliged to contract using standard PPA,[13] and
iii any deviations are to be pre-approved by Regulator.

The standard PPAs shall be well-balanced. This means the contract structure shall provide balance between Buyer and Seller in terms of obligations to generate technically sound energy and make full payments in

[13] *Once the market matures, 'party autonomy' may be adopted. This means the two parties to a contract may freely negotiate. What is best is that you have a right to negotiate a PPA, but (a) the regulator has the right to disallow the full cost pass through if too high (some countries permit regulatory approval) and (b) you have the right to use the whole of a standard PPA, or of certain of its provisions if you cannot agree with the negotiating counterpart.*

timely manner, termination rights, force majeure, legal jurisdiction of a neutral territory, inclusion of dispute resolution mechanism which is as per international laws, etc.

The above-mentioned **nine principles in essence capture the Regional Electricity Regulatory Principles (RERP) which should be adopted by the Member States to promote the wholesale market development in the region**.

3.4 Regulatory Key Performance Indicators (KPIs)

Based on discussions held with the stakeholders during the consultative workshop at Cairo during 13-14th May 2024 and further discussions held during the Information Management System (IMS) workshop at Zambia during 5-6th June 2024 and the validation workshop at Kigali during 30-31st July 2024, we are proposing a set of regulatory KPIs for efficient tracking and monitoring of regional regulatory performance.

The regulatory KPIs have been proposed to have a **uniform set of regional regulatory performance indicators across the COMESA Member States**. This will help to track regulatory performance across the region and work as a standard set of indicators for all regulators to track and compare their own country's performance against those of their peers and enable them to identify any areas where they may wish to consider future regulatory adjustments[14]. The indicators being proposed have been formulated considering regulatory best practices and keeping in view that many of the countries have just set up independent regulatory bodies whereas some are in the process of setting up regulatory bodies. The idea is to have a balanced set of KPIs ranging across aspects such as external governance, internal governance, financial, human resources and stakeholder management.

We have identified the below set of regulatory KPIs for regulators to report and track performance.

1. Average billing rate (USc/kWh)
2. Average cost of supply (USc/kWh)
3. Tariff cost reflectivity (%)
4. Regulatory outputs produced
5. Board diversity – Education, Stakeholder group, Gender
6. Financial autonomy (%)
7. Liquidity
8. Staffing level (%)
9. Gender diversity (%)
10. Age diversity (%)
11. Public consultations
12. Public consultations index

The disaggregation of the regulatory KPIs and their definitions are as below.

[14] *It should be noted that in other regions on the Continent, such as in ECOWAS, individual States are looking to COMESA States as being at the forefront of best regulatory practice in Africa. Such COMESA-wide, harmonised data will be of enormous value to the gradual shaping of a Continental model, helping not only COMESA States to align their own national laws and regulations optimally, but also States in other regions.*

Table 2: KPIs and data assets – Regulatory Performance

Indicator	Disaggregation	Definition
1. Regulatory performance		
1.1 Average billing rate (USc/kWh)	• Customer category • Overall utility level	Total revenue billed (USD) X 100 / (Total electricity sold (kWh))
1.2 Average cost of supply (USc/kWh)		Total cost of supply for the utility (USD) X 100 / (Total electricity sold (kWh)). Total cost covers cost across the entire value chain G-T-D
1.3 Tariff cost reflectivity (%)		An indicator of the extent to which tariff reflect the costs involved in electricity supply. Computed as ratio of average billing rate to average cost of supply, expressed as a percentage. An indicator value greater than 100% is desirable.
1.4 Regulatory outputs produced	Regulatory framework: • Regulations • License modifications • Codes, Technical standards • Guidelines • Any other framework elements Orders/ Directives/ Rulings[15]: • Licenses issued (%) and total number • Customer complaints handled (%) and total number • Dispute resolution (%) and total number • Compliance orders	Total number of regulatory outputs produced. Regulatory outputs can be of two types: 1) Regulatory framework, which consists of regulations, codes, guidelines, etc. that Licensees need to comply, and which specify powers provided to the Regulator for enforcement; and 2) Orders/ Directives/ Rulings issued by the Regulator under the powers provided to it by the regulatory framework.
1.5 (i) Board Diversity - Education	• Engineering • Legal • Economics • Business administration • Science • Humanities	Measures the diversity in the highest educational qualification of Board members, in terms of count of members against each discipline

[15] *The percentage indicators are computed over the total base of licensees/ customers*

Indicator	Disaggregation	Definition
1.5 (ii) Board Diversity - Stakeholder Groups	• Government • Utility • Consumer • Financial institutions • General	Measures the diversity of stakeholder groups represented by Board members.
1.5 (iii) Board Diversity - Gender	• Male • Female • Others	Measures the diversity of gender groups represented by Board members.
1.6 Financial autonomy (%)		Indicates the extent of financial autonomy from Government. It is expressed as percentage and calculated as: Operating revenue from non-Government sources / Total operating revenue
1.7 Liquidity		Measures the ability of the regulator to cover its short-term liabilities using its short-term assets. It is expressed as a ratio and calculated as: Current assets/Current liabilities
1.8 Staffing level (%)	• Economic regulation • Technical regulation • Legal • Admin, HR, Support functions	Measures the extent of positions staffed. It is expressed as a percentage and calculated as: Number of sanctioned staff positions filled as at year end / Total number of sanctioned positions as at year end
1.9 Gender diversity (%)		Measures the share of females in professional and technical staff. It is expressed as percentage and calculated as: Number of female professional and technical staff employed as at year end/ Total number of professional and technical staff employed as at year end
1.10 Age diversity (%)	• Below 30 years • 30 to 50 years • Above 50 years	Measures diversity of age groups represented in the regulator's staff. Age is measured at end of the reporting period.
1.11 Public consultations		Total number of public consultations conducted. This includes in-person meetings (public hearings) and wider dissemination in mass media such as newspaper, television, radio, and social media. Each mass medium, irrespective of number of brands or dissemination counts, is counted singly and separately.

Indicator	Disaggregation	Definition
1.12 Public consultations index		The ratio of "Public consultations" to "Regulatory outputs". A ratio greater than 1 is desirable.

The above mentioned regulatory KPIs have been discussed in detail below.

3.4.1 Average Billing Rate (ABR) (USc/kWh)

This KPI indicates the **average revenue billed by the utility** as a whole. The value of the KPI depends upon on the individual tariff rates charged to each customer category and the mix of energy and demand consumption by various customer categories. This KPI represents the ability of the utility to manage its revenue mix in order to recover its costs and thus is an indicator of the utility's financial sustainability.

It is defined as the average amount billed to all the customer categories per unit electricity sold. It is computed as follows:

[Total revenue billed (USD) X 100 / (Total electricity sold (kWh))]

No published benchmark data is available. The target should be close to the average cost of service for the licensee, preferably slightly higher than the cost.

The above has been considered as part of the regulatory KPIs as this helps the regulator track the performance of utility licensees.

3.4.2 Average Cost of Supply (USc/kWh)

This KPI indicates the **total cost of supply for the utility across the entire value chain Generation-Transmission-Distribution-Commercial**. It is computed as:

Total cost of supply for the utility (USD) X 100 / (Total electricity sold (kWh)).

The above has been considered as part of the regulatory KPIs as this helps the regulator track the performance of utility licensees.

3.4.3 Tariff Cost Reflectivity (%)

This indicator indicates the **ability of a utility to recover its cost of supply through the revenue generated from tariff**. In electricity industry where tariffs are set by the regulator, the level of tariffs is a key determinant of the tariff cost reflectivity. This ratio also indicates how well the utility has been able to maintain a control over its costs considering the level of tariffs set and thus is a good measure of its operational efficiency.

Computed as ratio of average billing rate to average cost of supply, expressed as a percentage. It is computed as:

*[Average Billing Rate/Average Cost of Supply] *100*

Benchmark Value: A target of 1 should be achievable.

An indicator value greater than 100% is desirable.

The utility should be able to recover all its costs.

One of the important powers of a regulator is the power to set transparent and non-discriminatory tariffs for connection, access and use of energy infrastructure. **Tariffs should reflect costs, provide incentives for efficient new investment and avoid cross-subsidization amongst grid users**.

3.4.4 Regulatory outputs produced

This indicator measures the **total number of regulatory outputs produced**. Regulatory outputs can be of two types: 1) Regulatory framework, which consists of regulations, codes, guidelines, etc. that Licensees need to comply, and which specify powers provided to the Regulator for enforcement; and 2) Orders/ Directives/ Rulings issued by the Regulator under the powers provided to it by the regulatory framework.

The indicator is a measure of productivity of a regulator in terms of key outputs produced which are core to the regulator's responsibilities. A higher value indicates higher productivity.

This indicator is generally not reported widely in a structured data format; hence no published benchmark is available for this indicator.

The indicator is disaggregated by the type of outputs:

- Regulatory framework:
    - Regulations (e.g. Tariff, Incentives)
    - License modifications
    - Codes, Technical standards (e.g. Grid code, Supply code)
    - Guidelines (e.g. Consumer charter)
    - Any other framework elements
- Orders/ Directives/ Rulings:
    - Licenses issued (%) and number
    - Customer complaints handled (%) and number
    - Dispute resolution (%) and number
    - Compliance orders

3.4.5 Board Diversity

This indicator measures diversity in composition of the Board. There are 3 sub-indicators which measure diversity in terms of: Education, Stakeholder groups represented and Gender.

This is an important **internal governance indicator** as this helps ensure that the board comprises members from diverse backgrounds who have informed opinions on diverse subjects concerning consumer interests. This indicator is a measure of regulatory strength in having board members from all representative disciplines.

3.4.6 Financial autonomy (%)

This indicator measures whether the regulator has **financial autonomy from the central government budget**. The international standard is 100%.

It is expressed as percentage and calculated as:

[Operating revenue from non-government sources /Total operating revenue]

Financial independence from the government requires 100% of regulatory revenues to come from sources not subject to government control. For the regulator to be credible in the institutional landscape, it is essential that it has sufficient resources to carry out its missions.

3.4.7 Liquidity

This liquidity indicator measures the **liquidity of the regulator's finances**. The higher the ratio, the more easily it can expect to cover financial obligations falling due in the short term.

It is expressed as a ratio and calculated as:

Current assets/Current liabilities

(where current assets are those expected to turn into cash within one year and where current liabilities are those which are expected to fall due within the same year)

This ratio is also known as the Current Ratio.

Anything above 1:1 is acceptable, but 2:1 is stable and healthy. The benchmark value of 2:1 is desirable.

In case the desired parameters for computation of this indicator at the regulator level are not available, revenues and expenses of the regulator may be reported.

3.4.8 Staffing Level (%)

This indicator measures the **extent of positions staffed**. It is expressed as a percentage and calculated as:

Number of sanctioned staff positions filled as at year end/Total number of sanctioned positions as at year end

This indicator is an indication of whether the regulator's current staffing levels allow it to carry out its jobs and responsibilities in an efficient manner. A ratio close to 1 is desirable.

If the ratio falls too low (below 0.50), it means that the present staffing levels are inadequate for the regulator to carry out its tasks effectively.

3.4.9 Gender Diversity (%)

This indicator measures the **share of females in professional and technical staff**.

It is expressed as percentage and calculated as:
Number of female professional and technical staff employed as at year end/ Total number of professional and technical staff employed as at year end

This indicator helps to track the equality of regulator recruitment in positions of responsibility and influence (i.e. empowerment). The indicator focuses only on professional and technical positions in line with the international practice in measuring female empowerment.

The regulators could in the future compare average salaries between male and female staff within any personnel classification band, but we suggest starting with this.

There is no generally accepted international standard for regulators, but the rational target would be 50%.

Assuming **equal opportunities to higher and further education, a merit-based recruitment policy would expect to recruit broadly as many women as men**[16].

3.4.10 Age diversity (%)

This indicator measures the share of staff in different age groups – below 30, 30-50, above 50 years. Regulatory role requires a proper balance between youth and experience. The young workforce is critical to manage tasks such as data collection, research, analysis, report writing, etc. The experienced workforce is crucial to provide sector insights, experiences, best practices, etc. as well as provide leadership, take decisions, maintain stakeholder relationships, etc.

3.4.11 Public Consultations

This indicator measures the **total number of public consultation events conducted**.

Good regulation requires the regulator to uphold the highest standards of compliance with its own procedures, particularly as it sits in judgment on the compliance failings of licensees and permit holders.

The regulations should be developed in meaningful consultation with the stakeholders. Like almost all regulators in developed countries, we recommend that the regulators in the COMESA region provide evidence and data to support their regulatory decisions. It is important to publish draft decisions and to seek stakeholder input when making decisions. **The principle of consulting with stakeholders is key, as is publishing the feedback from consultations.**

Public consultation with market participants during the regulator's decision-making process enhances the relevance of the decision and **reduces the risk of appeal**. This procedure, widely adopted in developed countries, underlines the importance of **transparency and cooperation between regulators and stakeholders**. We therefore recommend that all regulators set up a public consultation system and consider the contributions received in its draft decisions. This procedure does not necessarily have to be provided for in the law and can be a simple commitment by the regulator.

3.4.12 Public Consultations Index

This indicator measures the *ratio of "Public consultations" to "Regulatory outputs"*. For computation of this indicator, only those regulatory outputs need to be considered which are associated with public consultations. Those regulatory outputs such as consumer complaints handled, compliance orders etc. which are not associated with any public consultation may be omitted here.

A ratio greater than 1 is desirable. This indicator is a measure of the efficiency of the regulatory system. A ratio greater than 1 indicates that more public consultations were held compared to the regulatory outputs produced by the regulator in the year under consideration.

3.5 Conclusion

The above-mentioned **nine principles in essence capture the Regional Electricity Regulatory Principles (RERP) which should be adopted by the Member States to promote the wholesale market development in the region**. This **uniform set of principles** will make it easier for regional regulators and

[16] *In the 1990s, the UK oil and gas market was becoming dominated by women at junior and middle management in the professional cadres. The big oil and gas companies recruited the best graduates from the best UK universities, irrespective of gender. The results was about 75% women to 25% me in some fields including chemistry and marine engineering. A marked contrast to the UK power sector at the time!*

regional planning bodies such as EAPP to **assess progress of the Member States** on the enshrined principles and track progress in enhancing cross-border trade between the countries. It also allows Member States to **measure their own domestic frameworks against the benchmark and identify possible areas for refinement**, particularly where private sector participation and foreign direct investment in infrastructure is a government priority.

The regulatory KPIs have been proposed to have a **uniform set of regional regulatory performance indicators across the COMESA Member States**. This will help to track regulatory performance across the region and work as a standard set of indicators for all regulators to track and compare their own country's performance against those of their peers and enable them to identify any areas where they may wish to consider future regulatory adjustments.

4 Framework for evaluating regulatory practices and performance in COMESA region

4.1 Introduction

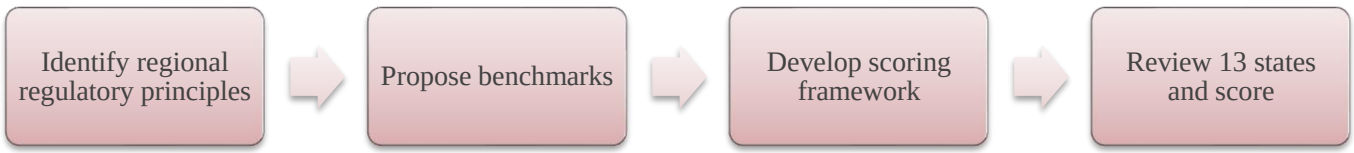
The 13 candidate states which are the focus of our study vary vastly in terms of power sector development. Egypt, Kenya and Uganda can be considered regional (if not continental) leaders in the implementation of power sector and regulatory reform, while others such as Somalia and South Sudan are only taking the first steps down the reform road.

Within the group are two states - Somalia and South Sudan – which do not yet have an integrated national grid - which makes interconnection with other states in the region difficult. These states are managed by private isolated distribution systems.

In order to make meaningful comparison of national legal and regulatory frameworks, it is necessary to develop each of the identified nine regional electricity regulatory principles into clear benchmarks. This is necessary to allow us to review the national frameworks of each of the 13 Member States against something concrete, and to identify whether legislative or regulatory provisions exist at the national level that approximate to the benchmark.

This process is undertaken in following broad steps: identification of the regional electricity regulatory principles, expanding them and creating the additional detail necessary to form clear benchmarks, identifying best practice and a scoring framework, and then applying this framework to the 13 participating States.

Figure 1: Development of the Evaluation Framework



Certain factors have had a bearing on our approach to the Study:

- The 13 States have different legal systems and practices
- The States are at radically different stages of development in electricity reform and regulation
- Different models of regulation are applicable in the States
- Member States with isolated grid systems, cannot trade across their borders, so some benchmarks are not relevant
- Member States will not all move forward at the same speed (the principle of variable geometry)

Despite these differences, what brings all the States together is that they share an overwhelming need to secure inward investment in energy infrastructure, which is the objective of this regional harmonization initiative. However, the intrinsic differences between the States require a cautious approach to benchmarking and certainly to interpretation of results. **The intention of this benchmarking exercise is not to compare States with each other and identify who 'does best'. Rather, it is a tool principally to**

be considered at regional level, to gain a better understanding of what the potential barriers to free, regional trade and investment are, as an aid to developing policy and other measures to tackle those barriers.

4.2 Model for collecting, analysing and evaluating RERP and regulatory KPI data in the COMESA region

To evaluate each Member State against evaluation parameter, described in preceding section, an evaluation tool has been developed. Each building block of the model regulatory framework is expressed as a parameter with a set of possible situations, which covers the spectrum of practices existing in COMESA Member States. For example, the parameter "**Grid code existence**" can cover the following 3 distinct possibilities:

1 Grid codes for T & D networks exist and are legally binding on System Users

2 Grid codes are defined but not mandatory

3 Grid codes do not exist

For each possibility, a score between zero to 1 is assigned, with 1 indicating the model or best practice. For the above example, the first possibility is assigned a score of 1, the second is assigned a score of 0.5 and the third is assigned a score of zero.

It is to be noted that the qualitative assessment of each of the sub-elements of the RERP is as detailed in the following table – these are in essence the key performance indicators (KPIs) for assessing each of the sub-elements of the RERPs. The performance of the Member States against each of the sub-elements is summed up to arrive at the principle level score and summed overall to arrive at the RERP score.

The complete evaluation tool is presented below. For each parameter, the evaluation is illustrated using the example of **Kenya**.

Further, all parameters have been presently allocated equal weightage. However, the tool will allow allocating different weightages based on relative importance of parameters and derive an overall weighted average score.

Table 3: RERP framework evaluation tool with illustration

	Evaluation parameter	Evaluation	Basis
1	***Regulatory capacity***		
1.1	**Legal constitution**	**1.00**	*Energy Act 2019, clause 9.2 provides for establishment of regulator as Body Corporate*
	Body corporate	1	
	Society, Trust, etc.	0.5	
	Department within a Government Ministry	0.25	
	Not applicable - No regulator/ Self-regulated	0	
1.2	**Governance**	**1.00**	*EPRA Annual Report 2021, pg. 5 and sec 5 -- EPRA is governed by a Board and 5 of*
	Regulator is governed by a Board and its members include at least 30% non-public officers	1	

	Evaluation parameter	Evaluation	Basis
	Regulator is governed by a Board and all its members are public officers	0.5	*its 10 members are non-public officers.*
	Regulator does not have a Board	0	
	Not applicable - No regulator/ Self-regulated	--	
1.3	**Board separation**	**1.00**	*EPRA Annual Report 2021, sec. 5.2 - The DG is an ex officio member of the Board with no voting rights at the Board meetings.*
	None of the Regulator's management including the Director General have voting rights in Board decisions	1	
	Atleast one member of the Regulator's management has voting rights in Board decisions	0	
	Not applicable - Board is absent	--	
1.4	**Appeals framework**	**1.00**	*Energy Act 2019, clause 9.2 -- Energy Tribunal*
	A Tribunal is available, and it is independent of the regulator	1	
	Tribunal is not available	0	
	Not applicable - No regulator/ Self-regulated	--	
1.5	**Income sustainability**	**1.00**	*Energy Act 2019, clause 20 -- levies on electricity sales, license fees, provision by Parliament, income from assets, bank deposit interest, donations* *EPRA Annual Report 2021, pg. 82 -- Electricity levy, License fees, Interest income*
	Multiple income sources (levies on sales, license fees, application fees, investments, subscriptions, etc.)	1	
	Single major income source (eg. license fees)	0.5	
	Majorly reliant on Government funding	0	
	Not applicable / Data not available	--	
1.6	**Expense coverage**	**1.00**	*EPRA Annual Report 2021, pg. 72 -- Income > Expenses for FY ending 2021 and 2020*
	Income > Expenses for atleast 3 of the last 5 years	1	
	Income > Expenses for less than 3 of the last 5 years	0.5	
	Income has never exceeded Expenses	0	
	Not applicable / Data not available	--	
1.7	**Staffing**	**1.00**	*74% of the structure is filled (based on primary data from the regulator)*
	> 70% of approved posts (as per Org chart) are staffed	1	
	50 - 70% of approved posts are staffed	0.5	
	<50% of approved posts are staffed	0.25	
	Org chart not prepared	0	
	Not applicable / Data not available	--	

	Evaluation parameter	Evaluation	Basis
2	***Regulatory powers***		
2.1	**Licensing mandate**	**1.00**	*Energy Act 2019, clause 117 -- generation, exportation, importation, transmission, distribution and retail supply require a license*
	Licensing is mandated in the Principal Legislation for each subsector	1	
	Licensing is mandated in the Principal Legislation, but some subsectors are excluded	0.5	
	Licensing is not mandated/ There is lack of clarity on licensing requirements	0	
2.2	**Licensing framework**	**0.66**	*Energy (Electricity Licensing) Regulations, 2012, Clause 2 and 4th Schedule -- the regulations apply to Generation, Transmission, Distribution, Supply, Distribution + Supply, Generation + Distribution + Supply. No specific regulations exist for Export, Import, Trading, even though the same is mandated as per the Principal Legislation*
	Licensing regulations are in-force legally and are defined comprehensively, for all subsectors	1	
	Licensing regulations are in-force legally and are defined comprehensively, but only for some subsectors	0.66	
	Licensing regulations are in-force legally for some/ all subsectors, but they are not comprehensively defined	0.33	
	Licensing regulations do not exist	0	
2.3	**Service charges**	**1.00**	*Clause 4, Energy (Electricity Tariffs) Regulations, 2022*
	Charges for all services are regulated	1	
	Charges for atleast some of the services are not regulated	0	
3	***Rule-based system operations and access***		
3.1	**Grid code existence**	**1.00**	*The Energy (Electricity Supply) Regulations, 2021 -- compliance of Kenya National Transmission Grid Code (KNTGC) and Kenya National Distribution Grid Code (KNDGC) is mandatory for every licensee*
	Grid codes for T & D networks exist and are legally binding on System Users	1	
	Grid codes are defined but not mandatory	0.5	
	Grid codes do not exist	0	
3.2	**Grid code comprehensiveness**	**1.00**	*KNTGC 2024 covers this requirement*
	Grid code is comprehensive	1	
	Grid code is not comprehensive	0	
	Not applicable as grid code does not exist	--	
3.3	**Grid code governance**	**1.00**	*KNTGC, chapter 4:*

	Evaluation parameter	Evaluation	Basis
	Grid code governance is strong	1	*Governance THE ENERGY (ELECTRICITY SUPPLY) REGULATIONS, 2021, clause 7-14 mandate EPRA to be responsible for Grid Code review and revision*
	Grid code governance is weak	0.5	
	No chapter on governance in the Grid code	0	
	Not applicable as grid code does not exist	--	
3.4	**Grid code revisions**	**1.00**	*KNTGC, chapter 4: Governance THE ENERGY (ELECTRICITY SUPPLY) REGULATIONS, 2021, clause 7-14 mandate EPRA to be responsible for Grid Code review and revision*
	Grid code revision mechanism is strong	1	
	Grid code revision mechanism is weak	0.5	
	No chapter on revision in the Grid code	0	
	Not applicable as grid code does not exist	--	
4	***Transparency***		
4.1	**Transparency of cost structure**	**0.25**	*Only KenGen accounts are fully separated and reported. KPLC carries out power purchase, import, transmission, distribution and retail supply and reports accounts as a bundled entity. Consider reviewing to (ii) as transmission is separated and KETRACO reports on its accounts*
	Accounts of Generation, Transmission, Distribution, Retail supply are fully separated and reported	1	
	Accounts of only Generation and Transmission are fully separated and reported	0.75	
	Accounts of only Generation are fully separated and reported	0.25	
	None is separated	0	
5	***Third party access***		
5.1	**Third party access (TPA)**	**1.00**	*Energy Act, clauses 136.1.c and 140.1.d*
	Allowed; to both transmission and distribution networks	1	
	Allowed; only to transmission network	0.5	
	TPA is not allowed	0	
5.2	**Wholesale power market competitiveness**	**0.50**	*IPPs are present but KPLC is the single buyer*
	Multiple sellers - Multiple buyers	1	
	Multiple sellers - Single buyer	0.5	
	Single seller - Single buyer	0	
5.3	**Electricity traded**	**0.75**	*Imports - 419 GWh. Total - 6805. Source: Kenya Bi-annual stats report (July-Dec*
	Share of (Imports + Exports) in country's electricity generation is > 10%	1	

	Evaluation parameter	Evaluation	Basis
	Share of (Imports + Exports) in country's electricity generation is 5-10%	0.75	*2023)*
	Share of (Imports + Exports) in country's electricity generation is 1-5%	0.5	
	Share of (Imports + Exports) in country's electricity generation is <1%	0	
6	***Level playing field***		
6.1	**Non-discriminatory TPA charges**	**0.00**	*TPA Charges are yet to be defined. There are draft regulations that will provide a framework for such charges in future.*
	TPA charges are transparent and same for all generators - state owned, IPPs located in the country and IPPs located outside the country	1	
	TPA charges are non-transparent/ higher for non-state-owned generators	0	
	Not applicable / Data not available	--	
6.2	**System operator independence**	**0.00**	*KETRACO has been designated as the system operator via a gazette notice. The Principal Legislation has made it illegal for the distributor to be the system operator.*
	None of the System Users have a controlling interest in the system operator.	1	
	Atleast one of the System Users has a controlling interest in the system operator || OR || One of the System Users is the System operator	0	
7	***System efficiency concerning TPA***		
7.1	**Cost reflective TPA charges**	**0.00**	*TPA Charges are yet to be defined. There are draft regulations that will provide a framework for such charges*
	Network access charges are reviewed atleast once every year; the methodology to determine the charges is well defined and cost reflective	1	
	Only 1 of the above aspects is true	0.5	
	None of the above aspects is true	0	
	Not applicable / Data not available	--	
7.2	**Timely grant of TPA**	**0.00**	*TPA Charges are yet to be defined. There are draft regulations that will provide a framework for such charges*
	Standard Operating Procedure (SOP) based timeline is < 4 weeks	1	
	SOP based timeline is 4-8 weeks	0.5	
	SOP based timeline is > 8 weeks	0	
	Not applicable / Data not available	--	
8	***Consumer rights***		

	Evaluation parameter	Evaluation	Basis
8.1	**Connection right**	**1.00**	*The Energy (Electricity Supply) Regulations, 2021, clause 16*
	Right to receive supply is provided in the law	1	
	Right to receive supply is not provided in the law	0	
8.2	**Connection framework**	**1.00**	*The Energy (Electricity Supply) Regulations, 2021, clause 16*
	Timeframe to connect a consumer is provided in the Regulations and the Form of Contract is approved by Regulator	1	
	Either the timeframe is not defined, or Form of Contract is not approved	0.5	
	Neither timeframe nor Form of Contract is available	0	
9	***Integration of renewable energy***		
9.1	**Grid connection requirements for VRPPs**	**1.00**	*Chapter 7, KNTGC*
	Grid code comprehensively includes connection requirements for VRPPs	1	
	Grid code includes connection requirements for VRPPs, but they are not comprehensive	0.5	
	Grid code does not include connection requirements for VRPPs	0	
	Not applicable as grid code does not exist	--	
9.2	**Contracting framework for RE generators**	**1.00**	*Kenya has developed standard PPAs for RE generators > 10 MW and < 10 MW*
	Well balanced contracting framework is available for RE generators	1	
	Contracting framework is available but it is not well balanced	0.5	
	No contracting framework exists	0	

The regulatory KPIs as discussed in section 3.4 of the report are being submitted separately as an **excel-based spreadsheet model**. The model has provisions to capture last five years' data. The disaggregation has been mentioned against the relevant KPIs wherever applicable.

4.3 Methodology for collecting, analysing and evaluating RERP and regulatory KPI data for the model

The methodology for collecting, analysing and evaluating RERP is as below.

- Each Member State should set up a nodal officer at the regulator end to report on the RERPs
- The timeframe for collection of data on an annual basis needs to be finalised and adhered to amongst the Member States

- Member States need to input scores/data on the RERP after review and approval by the designated officer
- Uniform excel-based template should be adopted
- Efforts should be made to get the desired information pertaining to the RERPs which are presently not being reported
- The RERP score for each Member State should be updated on an annual basis

The methodology for collecting and analysing regulatory KPIs is as below.

- Each Member State should set up a nodal officer at the regulator end to report on the KPIs
- The timeframe for collection of data on an annual basis needs to be finalised and adhered to amongst the Member States
- Member States need to input relevant data after review and approval by the designated officer
- Uniform excel-based template should be adopted
- Efforts should be made to get the desired data points pertaining to KPIs which are presently not being reported
- The KPIs data set should be updated on an annual basis

4.4 Conclusion

The evaluation framework developed above provides each Member State with guidance on how well-aligned they are with the identified RERPs. The same tool also shows the steps that the Member State should take that might take the country closer to the regional model and at the same time enhance its investment environment. The Consultant also believes that the evaluation framework so developed provides a **tool that can be used by each country in future years to measure itself periodically** as its legal and regulatory framework develops. It may also serve as guidance when developing regulatory texts, by providing a checklist of the principles which should be adopted to maximize compliance with the RERP.

The intention of this benchmarking exercise is not to compare States with each other and identify who *'does best'*. Rather, the intention of the above exercise is to provide regional bodies with a better understanding of the wider situation in terms of concordance with the identified RERP amongst the 13 States. This will inform regional planning and policy, particularly in terms of future support that may be needed from national governments, regulators and electricity operators.

5 Utility KPIs and Tracking Framework

5.1 Introduction

In this chapter, a list of key performance indicators (KPIs) and data assets have been proposed for comprehensive tracking of utility performance of COMESA Member States, considering their relevance to regulatory issues considering regional context and international best practices.

5.2 Identified current utility KPIs relevant to electricity regulation

The current utility KPIs being tracked by the Member States were reviewed based on the inputs provided during various rounds of consultations. The same were also reviewed based on the secondary resources available such as the World Bank UPBEAT portal and the Africa Energy Regulatory Index (ERI) report. It is noted that the Member States are presently reporting only very limited set of indicators pertaining to installed capacity, net energy generation, generation availability, peak demand, transmission and distribution system losses, import/export, SAIFI, SAIDI, transmission and distribution network length, number of customers and total energy billed. In many countries, required further disaggregation data sets are not available. For example, in some countries total energy billed is not available further based on the customer type. The refined utility KPIs listing is being proposed as discussed below in order to have a comprehensive and uniform utility performance monitoring data set.

5.3 Refined utility KPIs relevant to electricity regulation in COMESA region

A list of KPIs has been developed based on the review of existing performance reports provided by Member States and inputs provided by stakeholders during several rounds of consultations. The KPIs have been finalised based on discussions carried out with the stakeholders during the Consultative Workshop at Cairo during 13-14th May 2024 and further discussions held during the Information Management System (IMS) Workshop at Zambia during 5-6th June 2024 and the Validation Workshop at Kigali during 30-31st July 2024.

The KPIs and data assets have been proposed under the following heads:

1 Generation

2 System operations

3 Transmission – In country

4 Transmission – Tie-Lines

5 Distribution

6 Retail supply

7 Financial performance

8 Power market

9 Integration of renewable energy

A summary list of KPIs and data assets is described in the table below:

Table 4: Summary list of KPIs and data assets recommended for reporting

1. Generation	1.1 Installed capacity (MW) 1.2 Dependable capacity (MW) 1.3 Annual Energy generation capability (GWh) 1.4 Operating reserve capacity (MW, %) 1.5 Gross energy generated (GWh) 1.6 Net energy generated (GWh)	1.7 Self-consumption rate (%) 1.8 Forced outage duration (hours) 1.9 Planned outage duration (hours) 1.10 Generation availability (%) 1.11 Generation substation capacity (MVA)
2. System operations	2.1 Peak demand (MW), date and time 2.2 Minimum demand (MW), date and time 2.3 System load factor (%)	2.4 Number of frequency excursions: > 50.5 Hz or < 49.5 Hz 2.5 System minutes lost (minutes)
3. Transmission – In country	3.1 Average duration of forced interruptions (ADFI) (hours) 3.2 Average number of forced outages for all transmission lines (ANOFT) 3.3 Transmission availability (%) 3.4 Transmission system losses (%)	3.5 Transmission network length - country level (circuit-kms) 3.6 Transmission substation capacity - country level (MVA) 3.7 Network utilization factor - Transmission
4. Transmission – Tie-Lines	4.1 Electricity import (GWh) 4.2 Electricity export (GWh) 4.3 Transmission network length - Tie lines (circuit-kms)	4.4 Transmission network capacity - Tie lines (MVA) 4.5 Transmission substation capacity - Tie lines (MVA)
5. Distribution	5.1 Distribution system losses (%) 5.2 System Average Interruption Frequency Index (SAIFI) 5.3 System Average Interruption Duration Index (SAIDI) (hours) 5.4 Distribution network length (circuit-kms)	5.5 Distribution substation capacity (MVA) 5.6 Distribution stepdown transformer (XX/4_ _ or XX/2_ _ volts) capacity (MVA) 5.7 Network utilization factor - Distribution
6. Retail supply	6.1 Customer base 6.2 Prepaid customers (%) 6.3 Electricity access rate (%) 6.4 Total energy billed to customers (GWh) 6.5 Electricity consumption per capita (kWh)	6.6 Electricity consumption per unit GDP (GWh per USD million) 6.7 Customer Average Interruption Duration Index (CAIDI) (hours) 6.8 Staff productivity

7. Financial performance	7.1 O&M expenses index 7.2 Return on asset (%) 7.3 Return on equity (%) 7.4 Current ratio	7.5 Fixed asset turnover ratio 7.6 Total asset turnover ratio 7.7 Profit before tax (USD million) 7.8 Profit after tax (USD million)
8. Power market	8.1 Market share based on energy purchase (%)	8.2 Competition index/ Herfindahl-Hirschman Index for Generation function (HHI)
9. Integration of renewable energy	9.1 CO2 Emissions from Electricity Generation ('000 Tonnes)	9.2 Grid emission factor (Tonnes CO2/ MWh)

A detailed description of the indicators under each of the heads is provided below.

Table 5: KPIs and data assets - Generation

Indicator	Disaggregation *(refer note below table)*	Definition
1. Generation		
1.1 Installed capacity (MW)	• Generator connection • Generator technology	Nameplate or Rated or Design capacity of the generating plant/ unit under the condition of maximum reactive power flows or minimum power factor requirement
1.2 Dependable capacity (MW)	• Generator connection • Generator technology	Current maximum available capacity resulting from derating of installed capacity due to ageing plant, etc.
1.3 Annual Energy generation capability (GWh)	• Generator connection • Generator technology	Energy generation capability per annum for overall system = Sum of Energy generation capability of each power plant Energy generation capability per annum for a power plant = Plant availability factor X Installed Capacity X Plant Factor X 8760

Indicator	Disaggregation *(refer note below table)*	Definition
1.4 Operating reserve capacity (MW, %)		Operating reserve is the generating capacity available to the system operator within a short interval of time to meet demand in case of a generator fault or disruption in the supply. It is the sum of Spinning reserve and Quick reserve and considered as the size of single largest generation unit in the system. The size is to be taken as average over the reporting period. Spinning reserve is defined as the extra power generating capacity of the generator that is already synchronized to the system. This extra power is achieved by increasing the torque of the turbine rotor. Quick reserve is a fast-acting reserve designed to restore system frequency within one minute of a fault. The Operating reserve capacity will be expressed both in MW and % terms. For %, the total installed capacity shall be used as the base for calculating the percentage.
1.5 Gross energy generated (GWh)	• Generator connection • Generator technology	Total energy generated
1.6 Net energy generated (GWh)	• Generator connection • Generator technology	Net energy metered at plant busbar, net of auxiliary consumption within the plant premises.
1.7 Self-consumption rate (%)	• Generator connection • Generator technology	It is the extent of auxiliary energy consumption within the plant premises. It is expressed as a percentage and computed as: (Gross energy generated *less* Net energy generated) / Gross energy generated
1.8 Forced outage duration (hours)		The total duration of forced outages
1.9 Planned outage duration (hours)		The total duration of planned outages

Indicator	Disaggregation *(refer note below table)*	Definition
1.10 Generation availability (%)	• Generator connection • Generator technology	Fraction of period in which the Generation assets are available without any outages, expressed as a percentage. It is calculated as: [1 - (forced outages hours + planned outage hours)/ Total hours in the period]
1.11 Generation substation capacity (MVA)		Sum of installed capacity of generator transformers

Note:

- Generator connection: Grid-connected, Captive, Off-grid
- Generator technology: Large hydro > 10 MW, Thermal, Solar, Wind, Geothermal, Small Hydro < 10 MW, Biomass/ Biogas/ Cogeneration, Tidal wave, Imports

Table 6: KPIs and data assets - System operations

Indicator	Disaggregation	Definition
2. System operations		
2.1 Peak demand (MW), date and time	--	The value of highest demand experienced in the system during a reporting period
2.2 Minimum demand (MW), date and time	--	The value of lowest demand experienced in the system during a reporting period
2.3 System load factor (%)	--	This Data asset characterizes the system load curve in terms of the extent of its "peakiness" or "flatness". A value close to 100% denotes a flatter load curve. It is expressed as a percentage and computed as: [Energy transmitted through the system (GWh) X 1000] / (Peak demand (MW) X Number of hours in the reporting period)
2.4 Number of frequency excursions: > 50.5 Hz or < 49.5 Hz	--	Number of times system frequency crosses outside the specified band

Indicator	Disaggregation	Definition
2.5 System minutes lost (minutes)	--	This index measures the severity of each system disturbance relative to the size of the system, in terms of duration of total system wide blackout. It is determined by calculating the ratio of unsupplied energy during an outage to the energy that would be supplied for one minute if the supplied energy was at its peak value. One system minute indicates an equivalent of total system interruption, with the magnitude of annual system peak, for one minute The formula used for calculating the system minutes lost is: $$System\ Minutes\ Lost = \frac{Sum\ of\ unsupplied\ energy\ (MWmins)}{System\ peak\ demand\ (MW)}$$ When this index for a specific incident is greater than one minute, that incident can be normally classified as a major interruption.

Table 7: KPIs and data assets - Transmission-In country

Indicator	Disaggregation *(refer note below table)*	Definition
3. Transmission – In country		
3.1 Average duration of forced interruptions (ADFI) (hours)	Transmission voltages – EHV, HV	Total duration of forced interruptions affecting the transmission line circuits divided by the total number of interruptions, excluding force majeure and third-party interferences.
3.2 Average number of forced outages for all transmission lines (ANOFT)	Transmission voltages – EHV, HV	Total number of forced outages multiplied by 100 km and divided by the total kms length of transmission lines owned by licensee, per voltage level.
3.3 Transmission availability (%)	Transmission voltages – EHV, HV	Fraction of period in which the transmission assets are available without any outages, expressed as a percentage. It is calculated as: [1 - (forced outages hours + planned outage hours)/ Total hours in the period]
3.4 Transmission system losses (%)	--	The difference between the electrical energy entering the transmission network from generation and/or another transmission network and exiting the transmission network to another transmission network, distribution network or end-user, expressed as a percentage of electrical energy entering the transmission network

Indicator	Disaggregation *(refer note below table)*	Definition
3.5 Transmission network length – country level (circuit-kms)	Transmission voltages – EHV, HV	Total circuit length of transmission lines with start and end points within the country
3.6 Transmission substation capacity – country level (MVA)	Transmission voltages – EHV, HV	Sum of installed capacity of transformers at transmission substations located within the country
3.7 Network utilization factor - Transmission	--	Indicates extent of utilization or loading of transformation capacity of the network. Computed as the ratio of peak demand in transmission network (in MVA) to the total transformation capacity (in MVA) installed in transmission substations at country and interconnect levels

Table 8: KPIs and data assets - Transmission-Tie Lines

Indicator	Disaggregation *(refer note below table)*	Definition
4. Transmission – Tie Lines		
4.1 Electricity import (GWh)		Total units of electricity imported via tie lines
4.2 Electricity export (GWh)		Total units of electricity exported via tie lines
4.3 Transmission network length - Tie lines (circuit-kms)	Transmission voltages – EHV, HV	Total circuit length of transmission tie-lines
4.4 Transmission network capacity - Tie lines (MVA)	Transmission voltages – EHV, HV	Total bandwidth capacity of transmission tie-lines
4.5 Transmission substation capacity - Tie lines (MVA)	Transmission voltages – EHV, HV	Sum of installed capacity of transformers at transmission substations located in tie-lines

Table 9: KPIs and data assets - Distribution

Indicator	Disaggregation *(refer note below table)*	Definition
5. Distribution		
5.1 Distribution system losses (%)	--	The difference between the electrical energy entering the distribution network from the transmission network, another distribution network and/or embedded generation, and the electrical energy exiting the distribution network for consumption purposes, expressed as a percentage of the electrical energy entering the distribution network
5.2 System Average Interruption Frequency Index (SAIFI)	--	The total number of times that a typical consumer experiences forced interruptions during the period under review
5.3 System Average Interruption Duration Index (SAIDI) (hours)	--	The total duration of forced interruption faced by a typical consumer during the period under review
5.4 Distribution network length (circuit-kms)	Distribution voltages – MV, LV Overhead lines, Underground cabling	Total circuit length of distribution lines
5.5 Distribution substation capacity (MVA)	Distribution voltages – MV, LV	Sum of installed capacity of transformers at distribution substations
5.6 Distribution stepdown transformer (XX/4_ _ or XX/2_ _ volts) capacity (MVA)	--	Sum of installed capacity of distribution transformers
5.7 Network utilization factor - Distribution		Indicates extent of utilization or loading of transformation capacity of the network. Computed as the ratio of peak demand in distribution network (in MVA) to the total transformation capacity (in MVA) installed in distribution substations and distribution transformers.

Table 10: KPIs and data assets - Retail supply

Indicator	Disaggregation	Definition
6. Retail supply		
6.1 Number of customers	--	Number of customers with a legal connection to the network. Only those customers who consume electricity for their own use (and not for resale) to be considered.
6.2 Prepaid customers (%)		Ratio of the number of domestic customers with a legal prepaid meter connection to the total number of domestic customers with a legal connection
6.3 Electricity access rate (%)		Proportion of population with access to electricity. Computed as: (Number of domestic connections X Average household size) / Total population - Connections are to be considered across all connection types - Network connected, Off-network, Stand alone - Average household size is to be considered as per latest census data - Population is to be considered as per latest census data extrapolated to reporting year using decadal growth rate - All data to be considered combined for Urban and Rural
6.4 Total energy billed to customers (GWh)	• Customer category • Region	Total units of energy invoiced to customers during a reporting period
6.5 Electricity consumption per capita (kWh)		Indicates electricity consumption on a per-person basis. Computed as the ratio of total electricity consumed by residential customer category across the country (GWh) during the reporting period to the average population of the country during the reporting period
6.6 Electricity consumption per unit GDP (GWh per USD million)		Indicates electricity consumption on a per-unit GDP basis. Computed as the ratio of total electricity consumed by all customer categories across the country (GWh) during the reporting period to the total GDP produced by the country (USD million) during the reporting period
6.7 Customer Average Interruption Duration Index (CAIDI) (hours)		The average electrical power outage duration that any given Consumer would experience, measured in units of time. Computed as a ratio of SAIDI to SAIFI

Indicator	Disaggregation	Definition
6.8 Staff productivity		Indicates the average number of customers served by each employee. It is calculated as the ratio of total customers to total employees in the Distribution and Retail supply functions. Employees include permanent and contractual staff - vendors are excluded. In case of bundled utility, corporate/ common employees are to be allocated using the employee count of individual functions as basis.

Table 11: KPIs and data assets - Financial performance

Indicator	Disaggregation	Definition
7. Financial performance		
7.1 O&M expenses index	Licensee	Indicates O&M expenses incurred for every unit of electricity sold. - Expenses incurred only in the Distribution and Retail supply functions to be included. For bundled utilities, please allocate using the basis of Gross Fixed Asset value for each function - Include expenses incurred under the heads of employee salaries & benefits, repair & maintenance, administrative & general - Exclude expenses incurred under the heads of power purchase, depreciation/ amortization, interest & financing, tax - Exclude expenses of capital nature
7.2 Return on asset (%)	Licensee	Indicates ability of the Company to deploy its assets to generate profitability. A higher value is desirable Earnings Before Interest and Tax (EBIT) / (Net Fixed Assets + Current Assets)
7.3 Return on equity (%)	Licensee	Indicates ability of the Company to generate profitability on equity infused. A higher value is desirable Net Income/ Equity
7.4 Current ratio	Licensee	Indicates the availability of short-term assets to service short term obligations. A value greater than 1 is desirable and denotes higher liquidity available with the Company Current Assets/ Current Liabilities
7.5 Fixed asset turnover ratio	Licensee	Measures ability of Utility to generate revenues from utilization of Fixed assets Total operating revenue/ Average Net fixed assets
7.6 Total asset turnover ratio	Licensee	Measures ability of Utility to generate revenues from utilization of Fixed and Non-fixed assets Total operating revenue/ Average Total Net assets
7.7 Profit before tax (USD million)	Licensee	Profit after considering operating and financing costs, and before tax costs

Indicator	Disaggregation	Definition
7.8 Profit after tax (USD million)	Licensee	Net profit which is available to shareholders, after considering operating, financing, and tax costs

Table 12: KPIs and data assets - Power market

Indicator	Disaggregation	Definition
8. Power market		
8.1 Market share based on energy purchase (%)	Power producers	The ratio of energy generated by a particular power producer to the total energy on the interconnected system. Power producer here relates to an owner rather than individual generating unit or plant. If an owner owns several units or plants, the indicator would be computed on an aggregated basis for the owner.
8.2 Competition index/ Herfindahl-Hirschman Index for Generation function (HHI)	--	The Herfindahl Hirschman Index (HHI) analyses competition in the electricity sector by measuring the concentration of firms in a market thereby giving insight on the state of competition. It is calculated by squaring the market shares of all firms in the market and summing the squares as follows. Market share is at an owner level rather than individual generating unit or plant. HHI = summation (Market share) ^ 2 A market with an HHI of less than 0.1 is considered a competitive marketplace, an HHI of 0.15 to 0.25 is moderately concentrated, and an HHI of 0.25 or greater is highly concentrated.

Table 13: KPIs and data assets - Integration of renewable energy

Indicator	Disaggregation	Definition
9. Integration of renewable energy		
9.1 CO_2 emissions from electricity generation ('000 Tonnes)	--	CO_2 emissions generated from fossil fuel based generating plants
9.2 Grid emission factor (Tonnes CO_2/ MWh)	--	CO_2 emissions generated by fossil fuel based generating plants connected to the grid for every MWh of energy transmitted through the grid

5.4 Utility KPIs for Incentive-Based Regulation

Based on a review of the best practices adopted for incentive-based regulation[17], it is observed that the following metrics are generally deployed for performance improvement.

- Generator performance metrics (e.g. generator availability)
- Transmission efficiency metric (e.g. transmission availability)
- Distribution efficiency metrics (e.g. line losses)
- Reliability metrics (e.g. SAIDI, SAIFI, CAIDI, power quality measures)
- Load factor and peak load reduction targets

Given that **improving** the **utility operational efficiency** is a key objective, indication of efficiency signals to the utility through tariffs is critical. This is best achieved in a **multi-year framework** where the utility is permitted time to make investments for efficiency improvement and also reap its benefits. The incorporation of **performance incentives** in a rate of return based environment can be accomplished in the following manner:

- The regulator should identify performance parameters where there is good scope for the utility to improve and which can be used to determine the allowed expenses for cost recovery. These may include, among other parameters, plant availability factors, system load factor, distribution losses and customer outage periods
- The regulator should then establish baseline targets for these performance parameters by analysing historical performance or through benchmarking exercises. Further, it should forecast the improvements in these parameters that the utility can achieve over a three-to-five-year period
- The regulator should determine the revenue requirement to be recovered from tariffs over the selected multi-year period. For example, target distribution losses can be used to estimate power purchase requirement, which, in turn, is used to estimate power purchase cost. Also, target plant availability factors can be used to determine full or partial recovery of fixed costs of a generating plant
- The regulator should then carry out periodic tariff review exercises over the multi-year period. If utility surpasses its targeted performance on the parameters, it may be allowed to retain the entire gain or share a certain portion of it with the customers. On the other hand, if the utility under-performs on its targets, it may have to bear the entire loss or share a certain portion of it with customers. The gains/losses that are determined to be borne by the utility can be used to adjust the revenue requirement for a subsequent period
- **Tariff based incentives/penalties**: The tariff structure should provide tariff-based incentives/penalties to customers for improvement of energy efficiency, load factor, and power factor while maintaining simplicity of the structure

Based on the utility KPIs finalised for the COMESA region, following indicators are being proposed for **incentive-based regulation** to begin with:

- Generation availability (%)
- System load factor (%)
- Transmission availability (%)

[17] *Source: The Expansion of Incentive (Performance Based) Regulation of Electricity Distribution and Transmission in the United States Working Paper*

- Distribution system losses (%)

Indicators such as SAIFI and SAIDI can be deployed once the electricity market is further developed in the region as metrics for performance-based incentive regulation.

5.5 Models for collecting and analyzing utility KPI data for COMESA region

For ensuring effective performance at utility levels, continuous monitoring and evaluation is vital for tracking progress on a regular basis, evaluating strengths and weaknesses, and identifying improvement areas. The right set of tools can facilitate this process for Member States to undertake self-evaluation. The utility performance monitoring tool has been developed for effective performance monitoring and evaluation, which is being submitted separately as an **excel-based spreadsheet model**.

The model has provisions to capture last five years data and wherever applicable, based on relevant data inputs, it is capable of computing certain KPIs for example CAIDI – which is ratio of ratio of SAIDI to SAIFI. The disaggregation has been mentioned against the relevant KPIs wherever applicable.

5.6 Methodology for collecting and analysing utility KPI data for the models

The methodology for collecting and analysing utility KPI data for the models is as below.

- Each Member State should set up a nodal officer at the utility end to report on the KPIs
- The timeframe for collection of data on an annual basis needs to be finalised and adhered to amongst the Member States
- Member States need to input relevant data after review and approval by the designated officer
- Uniform excel-based template should be adopted
- Efforts should be made to get the desired data points pertaining to KPIs which are presently not being reported
- The KPIs data set should be updated on an annual basis

5.7 Conclusion

The utility KPIs have been proposed to have a **uniform set of regional utility performance indicators across the COMESA Member States**. This will help to track **utility performance across the region** and work as a **standard set of indicators** for all utilities to track and report their country's performance against those of their peers and enable them to identify areas which they may wish to consider improvement upon.

Further, the KPIs have been selected which broadly monitor the licensee and the utility's performance by tracking end-outcomes rather than micro-monitoring multiple intermediate outputs. While defining the KPIs, we have endeavoured that the KPIs are in line with international nomenclature and definitions in order to make performance benchmarkable with other utilities.

Going forward, each country should maintain a MIS (Management Information System) of these indicators which should help improve data quality, storage, management and retrieval of these indicators and data assets.

6 Strategy and Action Plan for Disseminating and Implementing RERP, Regulatory and Utility KPIs across COMESA Member States

6.1 Introduction

For ensuring effective performance at regulatory and utility levels, continuous monitoring and evaluation is vital for tracking progress on a regular basis, evaluating strengths and weaknesses, and identifying improvement areas. The right set of tools can facilitate this process for member countries to undertake self-evaluation. We have developed two such tools for effective performance monitoring and evaluation:

1. Regional Electricity Regulatory Principles (RERP) evaluation tool
2. Utility and regulatory performance monitoring tool

Both the above tools have been discussed in the respective sections. The tools will have to be updated on a periodic basis and results reviewed and monitored. The suggested regional electricity regulatory principles will require concerted efforts from the concerned Member States in moving towards greater regional harmonization. The States are at radically different stages of development in electricity reform and regulation and will require different levels of intervention at different stages. It is important that these tools are seen in the light of '*leave no country behind*' rather than ranking or comparing; the aim is not to air the gaps between the regulatory leaders and those who follow, but to aid the latter in identifying the measures to be taken to make up the ground.

The harmonisation across all states will take time and special efforts from all the concerned stakeholders to align and bring all Member States at the same level. The progress of each Member State is to be measured on an **incremental level** from the level from which the country started. The aim is to keep track of the performance and measure **progress of the States on a year-to-year basis** and provide **capacity building support** as required.

6.2 Implementation Strategy and Action Plan

The benchmarking exercise will help to capture the current level of harmonisation with the RERP and the KPIs for the different Member States. These first results can be considered the base data, against which incremental advances in future can be measured, either by the States themselves, or by regional bodies.

The results of the performance of the states on the RERPs can be published periodically by the regional regulator so that Member States take the necessary steps to ensure adherence to the principles enshrined under the RERP. The performance of the States can be measured on a year-to-year basis using the same evaluation tool developed for RERP and results compared. Incremental advances in the scores on a year-to-year basis need to be publicized and transparency ensured so as to make the region stronger together as one unit. The performance of the country on a year-to-year basis can be compared using an excel spreadsheet model being submitted separately alongside this report. A snapshot of the same is as below.

Figure 2: Illustrative comparison of the country performance year-on-year on RERP

S. No.	RERP	Past Year	Present Year	Future Year
1	Regulatory capacity	3.57	3.57	3.57
2	Regulatory powers	4.00	4.00	4.00
3	Rule-based system operations and access	3.63	4.00	4.00
4	Transparency	4.00	4.00	4.00
5	Third party access	3.01	3.01	3.51
6	Level playing field	1.00	2.50	2.50
7	System efficiency concerning TPA	1.00	4.00	4.00
8	Consumer rights	4.00	4.00	4.00
9	Integration of RE	4.00	4.00	4.00
	Average	**3.13**	**3.68**	**3.73**

Legend: 1-2 is Red; 2-3 is Orange; 3-4 is Yellow; 4 is Green

An analysis of the above, for example, shows that the country has improved its scoring on level playing field and system efficiency concerning TPA (RERP 6 and 7) by the introduction of specific regulations concerning TPA charges – making them cost reflective and ensuring grant of TPA for non-complex connection requirements in a timely manner. The country has also improved its scoring on RERP 3 – which shows that the grid code requirements were made more stringent and in compliance with the sub-elements of RERP 3. Similar analysis can be carried out for the improvement in score in the ensuing year.

The other steps necessary at a regional, collective level to promote harmonisation and standardisation are:

- RERP tool developed can provide checklist for countries who, in particular, are looking to compare any legislative drafts for regulation against the harmonised benchmarks
- Development of standardised texts and regulatory mechanisms to ensure that investors have the rights to use model agreements or clauses of such agreements where they are not able to agree with their national contracting party
- Availability of key documents in the public domain, grouped together and easily and freely accessible
- Capacity building and support to national regulators and operators, and the continuing collaboration between regulators through RAERESA and its sister regional organisations, with similar efforts at operator (especially TSO) levels
- Regional regulator RAERESA to monitor and report performance of the Member States as an aid to the latter rather than as a European style compliance body
- An active role for the East Africa Power Pool (EAPP), and similar collaboration of the EAPP with other regional pools in Africa, leading to a gradual convergence in good trading mechanisms, rules and practices across the Continent

<u>Standardised texts</u>

The principal texts where standardisation will promote cross-border electricity trade are indicated already in the RERP framework; they are those that underpin third party access. The texts fall under four categories: licence conditions, agreements, codes and pricing methodologies. Standardising these legal texts will help in achieving a faster compliance with the RERP framework.

Licensing conditions include standard license conditions for generation, transmission network operations, transmission system operations, market operations, import/export, interconnector operation, distribution and supply etc. Standard agreements include - wheeling agreement, interconnector access agreement, transmission connection agreement, transmission use-of-system agreement, model power purchase/sales agreement etc. Standardising the grid code (including various sub-codes) would also be a critical element. Pricing methodologies include transmission use-of-system charging methodology, transmission connection charging methodology, wheeling charging methodology etc.

In talking of standard form documents, it should be noted that, while most of the body of such documents are highly 'portable' in that they will be almost universally applicable, there will always be areas which must be customised to meet the local circumstances, particularly in terms of matters such as specific planning or operating standards, or particular exceptions to standard pricing principles to meet local (and possibly transitional) circumstances.

The situation is different with power purchase / power sales agreements as these tend to require more customisation to specific circumstances and they do contain commercially sensitive information – prices are freely negotiated, not regulated, although they may be subject to a requirement of prior regulatory approval in some States. However, the development of standard form commercial terms and conditions can be beneficial for States which do not have substantial negotiating experience and who do not have their own commercial lawyers. The development of 'custom' agreements for individual projects is generally costly and may introduce additional commercial risks for States that are commercially inexperienced as they are often at a negotiating disadvantage compared with project developers. It is not uncommon for agreements developed in these circumstances to place undue risk (technical, commercial, financial etc.) on the State rather than on the developer. For this reason, the development of standard terms and conditions for the non-specific provisions of the power purchase/sales agreement may be done.

The existence of standard form network agreements that have appropriate risk allocation already built-in provide a valuable safeguard for governments and national operators. If the documents in these four areas are standardised, not only will the cost of projects reduce due to the more certain and transparent trading rules, which lower operator risk, but much cost, effort and duplication will be avoided for individual States and for project developers in what is a complex area of electricity regulation**.**

Availability of documents in the public domain

All key documents such as the grid code, license conditions, wheeling agreement, interconnector access agreement, transmission use-of-system charging methodology etc. as discussed above should be made available in the public domain.

Capacity building and support

Some areas of the RERP do not lend themselves to standard form texts. Here we recommend that the regional regulators develop and make available guidance notes which suggest 'best practice' approaches to areas of regulation that have a bearing on third party access and cross-border trade. Subjects where this could be appropriate include:

- Principles for functional separation
- Principles for unbundled pricing and accounting separation
- Principles for promoting competition and reducing barriers to entry

- Guidelines for integration of renewable energy resources
- Guidelines on the use of common terms in electricity trade and third-party access

Likewise, additional capacity building support may be provided to the Member States in computation and reporting of the regulatory and utility KPIs.

Monitor and report performance of the Member States

Each Member State should set up a nodal officer to report performance on the RERP and the KPIs. The timeframe for collection of data on an annual basis needs to be finalised and adhered to amongst the Member States. Member States need to input relevant data after review and approval by the designated officer. Efforts should be made to get the desired data points pertaining to KPIs which are presently not being reported. The evaluation framework tool for both RERP and KPIs should be updated on an annual basis. Any desired training or capacity building support required for this should be discussed amongst the Member States and regional capacity building sessions can be conducted in support of this.

Active role of the East Africa Power Pool

EAPP can play a major role in aligning and strengthening various documents required for smooth interconnection between countries such as the grid code, transmission inter-connector agreement, transmission connection charging methodology, wheeling charging methodology etc. To give an example, countries which have not issued a grid code as yet can align their grid code documents with that issued by the East Africa Power Pool (EAPP). This would make it easier for states at early stages of development to align their frameworks with that suggested under the RERP framework.

6.3 Conclusion

The Regional Electricity Regulatory Principles (RERP) evaluation tool and utility and regulatory performance monitoring tools will have to be updated on periodic basis and results of the same reviewed and monitored. The suggested regional electricity regulatory principles will require concerted efforts from the concerned Member States in moving towards greater regional harmonization. The States are at radically different stages of development in electricity reform and regulation and will require different level of intervention at different stages. It is clear that the individual effort to introduce and monitor reforms will be enormous compared with the human resources available to many regulators and governments. The individual challenge for some smaller states at a nascent stage of power sector development in achieving a high level of compliance with the RERP will be more than the ones with already developed regulatory frameworks. The tools should be viewed as an aid to help these states to gain ground, learning from more advanced peers and to avoid ‘reinventing the wheel’ rather than some kind of external enforcement mechanism.

The regional regulatory and market bodies will have a major role to play in supporting all States, but the greatest benefit will be felt by those countries that have limited human, technical and financial capacities at present. By extending the practice of using technical, economic, legal and regulatory working groups drawn from experts within the Member States, the work on harmonising legal and regulatory arrangements can be done through coordination and cooperation, under the leadership of the regional regulatory and market bodies.

7 Summary and Conclusion

7.1 Introduction

This chapter provides summary of the entire report. This report deals with **Workstream 1** - component on Elaboration of Regional Electricity Regulatory Principles (RERP), Regulatory and Utility Key Performance Indicators (UKPI) for COMESA. This involves the development of guidelines and frameworks that espouse regulatory principles, practices, and key performance indicators (KPIs) to be adopted by the COMESA Member States that will be applied as a tool for regulatory peer reviews in the region to track progress of adoption and implementation towards harmonization.

Noting the obstacles to cross-border trade caused by differences in the rules applied at the national level, harmonized Regional Electricity Regulatory Principles (RERP) and a uninform set of KPIs are being proposed. A **uniform set of regulatory principles and KPIs** is essential to steer Member States towards the development of a **consistent regulatory environment** across a significant part of the continent; in turn, this process will improve **regulatory certainty** both for public and private sector licensees and further strengthen States' ability to attract private sector capital.

7.2 Key Outcomes

Based on a review of the current regulatory practices and benchmarking the same with international best practices, the regional electricity regulatory principles (RERP) and regulatory and utility KPIs are being proposed.

The Regional Electricity Regulatory Principles (RERP) espouse regional regulatory principles that can be applied as a tool for regulatory peer-reviews in the region to track progress of adoption and implementation of the Member States towards harmonized principles. The RERP are being proposed under the following groupings:

1 Regulatory capacity - existence of an independent regulator operating under good governance rules

2 Regulatory powers - including tariff setting and licensing

3 Rule-based system operations and access - regulatory approval of a standardized grid code

4 Transparency - clear visibility of the electricity value chain

5 Third party access (TPA)

6 Level Playing Field - regulated TPA charges; presence of a licensed system operator as a ring-fenced function

7 System Efficiency concerning TPA - cost reflective and timely grant of TPA

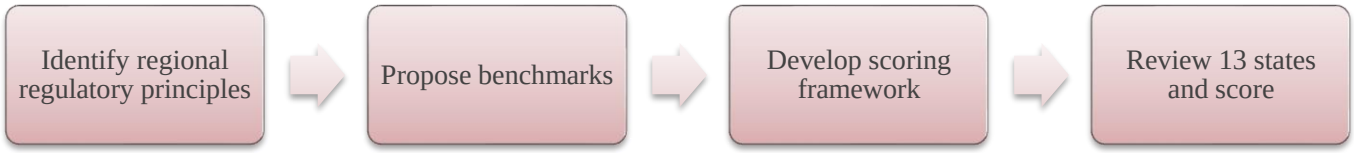
8 Clear Consumer Rights

9 Integration of renewable energy - clear provisions for RE generators, including access, use of system and dispatch

In order to make meaningful comparison of national legal and regulatory frameworks, it is necessary to develop each of the identified nine regional electricity regulatory principles into clear benchmarks. This is required to review the national frameworks of each of the 13 Member States against something concrete, and to identify whether legislative or regulatory provisions exist at the national level that approximate to the benchmark.

This process is undertaken in following broad steps: identification of the regional electricity regulatory principles, expanding them and creating the additional detail necessary to form clear benchmarks, identifying best practice and a scoring framework, and then applying this framework to the 13 participating States.

Development of the Evaluation Framework for RERP



The evaluation framework developed above provides each Member State with guidance on how well-aligned they are with the identified RERPs. The same tool also shows the steps that the Member State should take that might take the country closer to the regional model and at the same time enhance its investment environment. The Consultant believes that the evaluation framework so developed provides a **tool that can be used by each country in future years to measure itself periodically** as its legal and regulatory framework develops. The intention of this benchmarking exercise is not to compare States with each other and identify who *'does best'*. Rather, the intention of the above exercise is to provide regional bodies with a better understanding of the wider situation in terms of compliance with the identified RERP amongst the 13 States.

Regulatory and Utility KPIs

Based on discussions held with the stakeholders during the consultative workshop at Cairo during 13-14th May 2024 and further discussions held during the Information Management System (IMS) workshop at Zambia during 5-6th June 2024 and the validation workshop at Kigali during 30-31st July 2024, the regulatory and utility KPIs are being proposed.

The KPIs have been proposed to have a **uniform set of regional regulatory and utility performance indicators across the COMESA Member States**. This will help to track performance across the region and work as a standard set of indicators for the regulators and utilities to track and compare their own country's performance against those of their peers and enable them to identify any areas where they may wish to consider future regulatory adjustments[18].

Following regulatory KPIs are being proposed:

1. Average billing rate (USc/kWh)

[18] *It should be noted that in other regions on the Continent, such as in ECOWAS, individual States are looking to COMESA States as being at the forefront of best regulatory practice in Africa. Such COMESA-wide, harmonised data will be of enormous value to the gradual shaping of a Continental model, helping not only COMESA States to align their own national laws and regulations optimally, but also States in other regions.*

2. Average cost of supply (USc/kWh)
3. Tariff cost reflectivity (%)
4. Regulatory outputs produced
5. Board diversity – Education, Stakeholder group, Gender
6. Financial autonomy (%)
7. Liquidity
8. Staffing level (%)
9. Gender diversity (%)
10. Age diversity (%)
11. Public consultations
12. Public consultations index

Summary list of Utility KPIs and data assets recommended for reporting

1. Generation	1.1 Installed capacity (MW) 1.2 Dependable capacity (MW) 1.3 Annual Energy generation capability (GWh) 1.4 Operating reserve capacity (MW, %) 1.5 Gross energy generated (GWh) 1.6 Net energy generated (GWh)	1.7 Self-consumption rate (%) 1.8 Forced outage duration (hours) 1.9 Planned outage duration (hours) 1.10 Generation availability (%) 1.11 Generation substation capacity (MVA)
2. System operations	2.1 Peak demand (MW), date and time 2.2 Minimum demand (MW), date and time 2.3 System load factor (%)	2.4 Number of frequency excursions: > 50.5 Hz or < 49.5 Hz 2.5 System minutes lost (minutes)
3. Transmission – In country	3.1 Average duration of forced interruptions (ADFI) (hours) 3.2 Average number of forced outages for all transmission lines (ANOFT) 3.3 Transmission availability (%) 3.4 Transmission system losses (%)	3.5 Transmission network length - country level (circuit-kms) 3.6 Transmission substation capacity - country level (MVA) 3.7 Network utilization factor - Transmission
4. Transmission – Tie-Lines	4.1 Electricity import (GWh) 4.2 Electricity export (GWh) 4.3 Transmission network length - Tie lines (circuit-kms)	4.4 Transmission network capacity - Tie lines (MVA) 4.5 Transmission substation capacity - Tie lines (MVA)

5. Distribution	5.1 Distribution system losses (%) 5.2 System Average Interruption Frequency Index (SAIFI) 5.3 System Average Interruption Duration Index (SAIDI) (hours) 5.4 Distribution network length (circuit-kms)	5.5 Distribution substation capacity (MVA) 5.6 Distribution stepdown transformer (XX/4_ _ or XX/2_ _ volts) capacity (MVA) 5.7 Network utilization factor - Distribution
6. Retail supply	6.1 Customer base 6.2 Prepaid customers (%) 6.3 Electricity access rate (%) 6.4 Total energy billed to customers (GWh) 6.5 Electricity consumption per capita (kWh)	6.6 Electricity consumption per unit GDP (GWh per USD million) 6.7 Customer Average Interruption Duration Index (CAIDI) (hours) 6.8 Staff productivity
7. Financial performance	7.1 O&M expenses index 7.2 Return on asset (%) 7.3 Return on equity (%) 7.4 Current ratio	7.5 Fixed asset turnover ratio 7.6 Total asset turnover ratio 7.7 Profit before tax (USD million) 7.8 Profit after tax (USD million)
8. Power market	8.1 Market share based on energy purchase (%)	8.2 Competition index/ Herfindahl-Hirschman Index for Generation function (HHI)
9. Integration of renewable energy	9.1 CO2 Emissions from Electricity Generation ('000 Tonnes)	9.2 Grid emission factor (Tonnes CO2/ MWh)

The corresponding excel-based models for monitoring regulatory and utility KPIs are being submitted alongside.

Strategy and Action Plan

The benchmarking exercise will help to capture the current level of harmonisation with the RERP and the KPIs for the different Member States. These first results can be considered the base data, against which incremental advances in future can be measured, either by the States themselves, or by regional bodies.

The results of the performance of the states on the RERPs can be published periodically by the regional regulator so that Member States take the necessary steps to ensure adherence to the principles enshrined under the RERP. The performance of the States can be measured on a year-to-year basis using the same evaluation tool developed for RERP and results compared. Incremental advances in the scores on a year-to-year basis need to be publicized and transparency ensured so as to make the region stronger together as one unit.

The other steps necessary at a regional, collective level to promote harmonisation and standardisation are as:

- RERP tool developed can provide checklist for countries who, in particular, are looking to compare any legislative drafts for regulation against the harmonised benchmarks
- Development of standardised texts and regulatory mechanisms to ensure that investors have the rights to use model agreements or clauses of such agreements where they are not able to agree with their national contracting party
- Availability of key documents in the public domain, grouped together and easily and freely accessible
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- Regional regulator RAERESA to monitor and report performance of the Member States as an aid to the latter rather than as a European style compliance body
- Active role for the East Africa Power Pool (EAPP), and similar collaboration of the EAPP with other regional pools in Africa, leading to a gradual convergence in good trading mechanisms, rules and practices across the Continent

7.3 Conclusion

The above-mentioned **nine principles in essence capture the Regional Electricity Regulatory Principles (RERP) which should be adopted by the Member States to promote the wholesale market development in the region**. This **uniform set of principles** will make it easier for regional regulators and regional planning bodies such as EAPP to **assess progress of the Member States** on the enshrined principles and track progress in enhancing cross-border trade between the countries. The RERP evaluation framework allows Member States to **measure their own domestic frameworks against the benchmark and identify possible areas for refinement**, particularly where private sector participation and foreign direct investment in infrastructure is a government priority.

The regulatory and utility KPIs have been proposed to have a **uniform set of regional regulatory and utility performance indicators across the COMESA Member States**. This will help to track regulatory and utility performance across the region and work as a standard set of indicators for all regulators to track and compare their own country's performance against those of their peers and enable them to identify any areas where they may wish to consider future regulatory adjustments