Africa Regional Country Window

Energy System Transformation Outlook (ESTO)

GET.transform is co-funded by

20 January 2026

Contents

Abbreviations

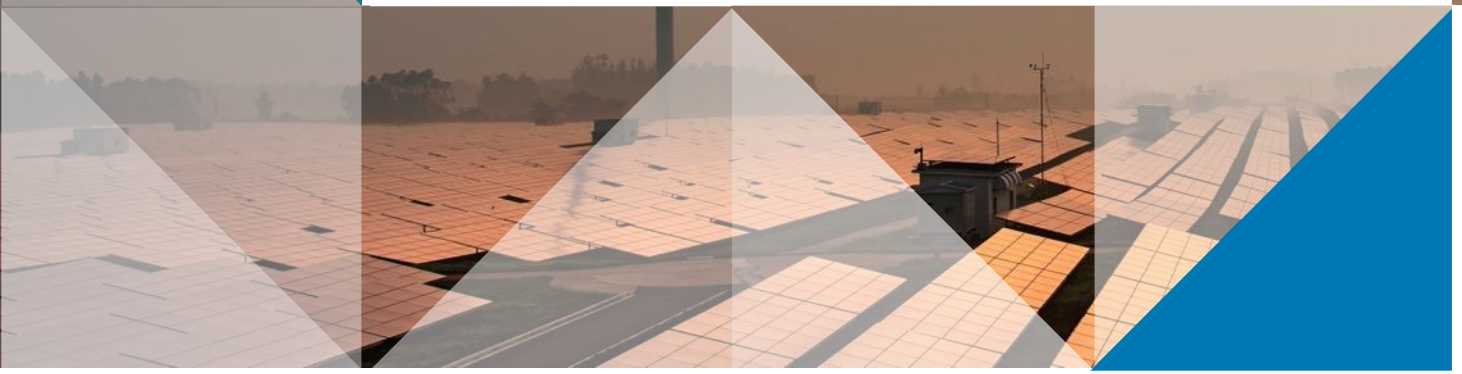
Term	Meaning
AFUR	African Forum for Utility Regulators
ASCENT	Accelerating Sustainable and Clean Energy Access Transformation
AUC	African Union Commission
AUDA-NEPAD	African Union Development Agency - New Partnership for Africa's Development
CAPP	Central African Power Pool
CEN-SAD	Community of Sahel-Saharian States
CMP	Continental Master Plan
COMELEC	Comité Maghrébin de l'Electricité (Maghreb Electricity Committee and North African Power Pool)
COMESA	Common Market for Eastern and Southern Africa
CORREAC	Central Africa Regional Energy Regulation Commission
EAC	East African Community
EACREEE	East African Centre of Excellence for Renewable Energy and Energy Efficiency
EAPP	Eastern Africa Power Pool
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States

Term	Meaning
EREA	Energy Regulators Association of East Africa
EU	European Union
GDP	Gross Domestic Product
IEA	International Energy Agency
IGAD	Intergovernmental Authority on Development
IRB	Independent Regulatory Board of the Eastern Africa Power Pool
IRENA	International Renewable Energy Agency
RAERESA	Regional Association of Energy Regulators for Eastern and Southern Africa
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
RERA	Regional Energy Regulators Association of Southern Africa
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SARERA	SADC Regional Energy Regulatory Authority
SEforALL	Sustainable Energy for All
UNIDO	United Nations Industrial Development Organization
WAPP	West African Power Pool

GET.transform

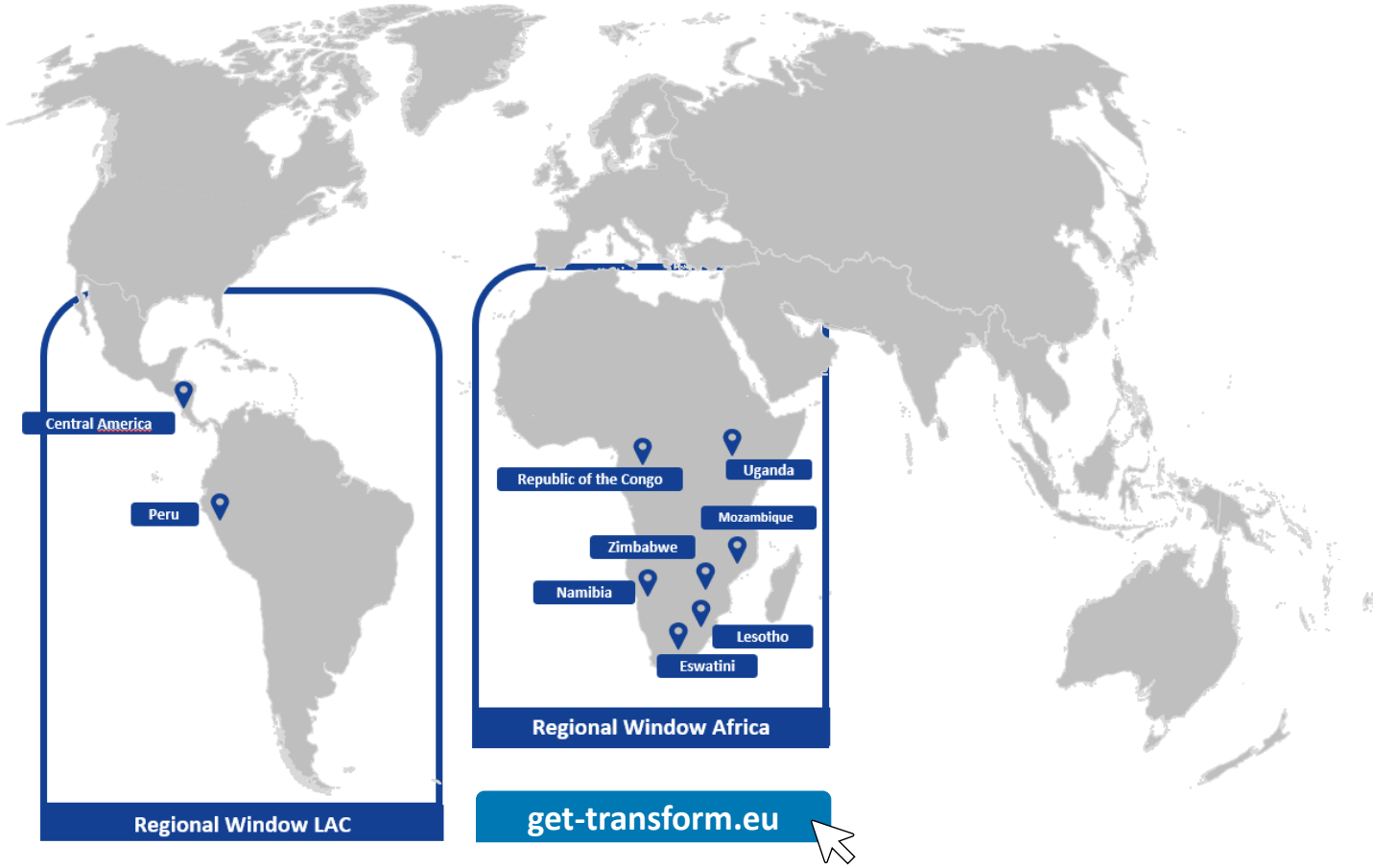
1

ABOUT GET.transform



What is GET.transform?

- Technical assistance (TA) and capacity building for the **public sector** to establish conducive policy and investment frameworks for the transition of the energy sector
- Hub of expertise with **> 50 renowned (inter)national energy experts**
- Implementation through **regional** and **country windows** with expert staff on the ground incl. secondments
- **Scaling across countries** through collaboration with regional institutions and other TA initiatives



GET.transform

GET.transform Workstreams

LONG TERM ENERGY PLANNING

Developing integrated energy and power system investment plans, outlining development paths for energy sector transformation

RENEWABLE ENERGY GRID INTEGRATION

Updating of technical power system planning and operational procedures that enable the operation of renewable energy dominated power systems

ON-GRID REGULATION & MARKET DEVELOPMENT

Supporting institutional reforms that allow for new market actors and renewable energy participation: market model design, non-discriminatory grid access, cost-reflective services

Design and management of solicited auctions as well as market-driven mechanisms for procuring on-grid energy

OFF-GRID REGULATION & MARKET DEVELOPMENT

Supporting off-grid electrification planning and data management frameworks

Developing mini-grid regulatory frameworks and technical standards and designing award mechanisms for procuring off-grid energy

GET.transform

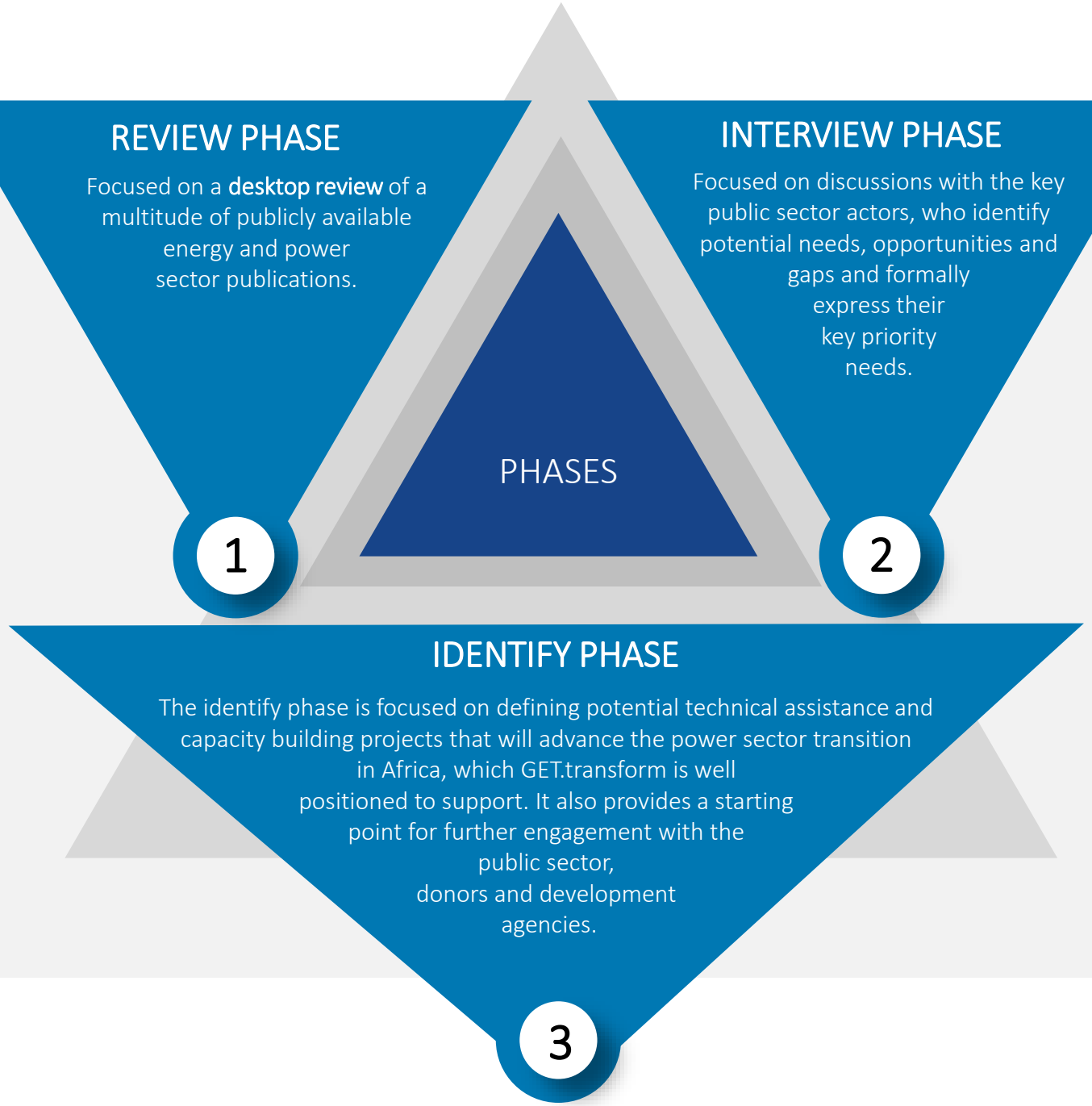
2

AFRICA
REGIONAL ESTO

GET.transform

Foreword

The purpose of the Energy Sector Transformation Outlook (**ESTO**) is to document a high-level summary of the electricity landscape in Africa and to present the outcome of a high-level overview and assessment that follows a 'review, interview, identify' approach.



The ESTO is not prescriptive of what should be done by the continental actors or the public sector actors.

RATHER

The ESTO serves as a feedback mechanism. It helps GET.transform gain a deeper understanding of Africa's power sector and identify areas where GET.transform can support continental and public sector actors. Additionally, it allows GET.transform to explore synergies with other donors and development agencies.

Africa Key Figures

	Africa	World
Location	Africa – *55 countries*(1)	
Population (2022)	1,424 M (Urban 44% - Rural 56%) *54 countries*	*7,950 M* *(Urban 57% - Rural 43%)*
GDP per capita (2022)	US$ 1,982 *52 countries*(2)	*US$ 12,743*
GDP growth (2022)	4.68% *52 countries*(2)	*3.09%*
Electricity access (2021)	58% (Urban 83%, Rural 40%) *54 countries*	*91%* *(Urban 97% - Rural 84%)*
Electricity demand per capita (2021)	752 kWh *35 countries*	*3,561 kWh*
Carbon dioxide (CO_2) emissions (2021)	1.13 tons per capita *54 countries*	*4.65 tons per capita*
Electricity Carbon Intensity (2021)	419 $gCO_2eq.$ / kWh *54 countries*	*490* $gCO_2eq.$ / kWh

- Africa represents 18% of the global population, yet only slightly more than half of its population currently has access to electricity.
- On average, an individual in Africa consumes five times less electricity and emits four times less CO2 compared to the global average.

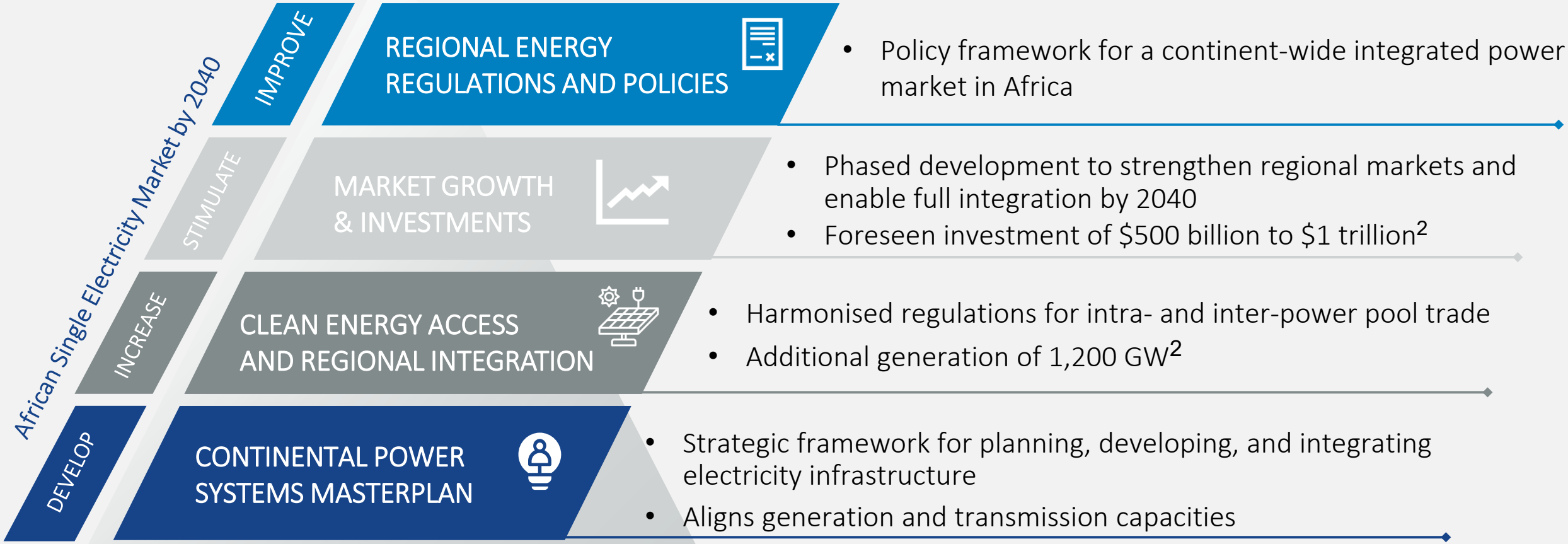
(1) Including Sahrawi Arab Democratic Republic not considered by UN. (2) No data for Eritrea and South Sudan

All data from World Bank except Electricity demand per capita, Electricity Carbon Intensity and Carbon dioxide emissions from Our World in Data

GET.transform

Africa Energy Vision

To transform Africa's energy landscape towards achieving universal access to affordable, reliable, and sustainable electricity for all Africans by 2040 - Africa Power Vision[1]



1) Africa Power Vision (APV) - The Virtual PIDA Information Center 2) EEAS - Powering Africa

Key Frameworks Shaping Africa's Gender Vision

Africa Agenda 2063

Gender Vision: An inclusive Africa where all citizens can participate in decision-making and where no one is left behind.

African Union (AU) Gender Policy 2009

Promotes a gender responsive environment & practices as well as the enforcement of human rights, gender equality and women's empowerment commitments.

01

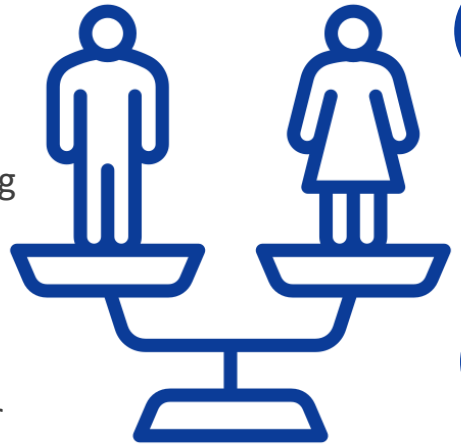
Aspiration 6 - Agenda 2063

Focuses on creating a continent where development is driven by its people, particularly women, youth, and with a strong emphasis on child care.

02

Constitutive Act of the African Union

Article 3 (Protocol on Amendments) calls for the effective participation of women in decision-making, particularly in the political, economic and socio-cultural areas.



03

Commitment 7 – AU Gender Policy

The AU is committed to mainstreaming gender across all key-issues sectors of development, including Infrastructure and Energy.

04

Gender Equality and Women's Empowerment (GEWE) Strategy

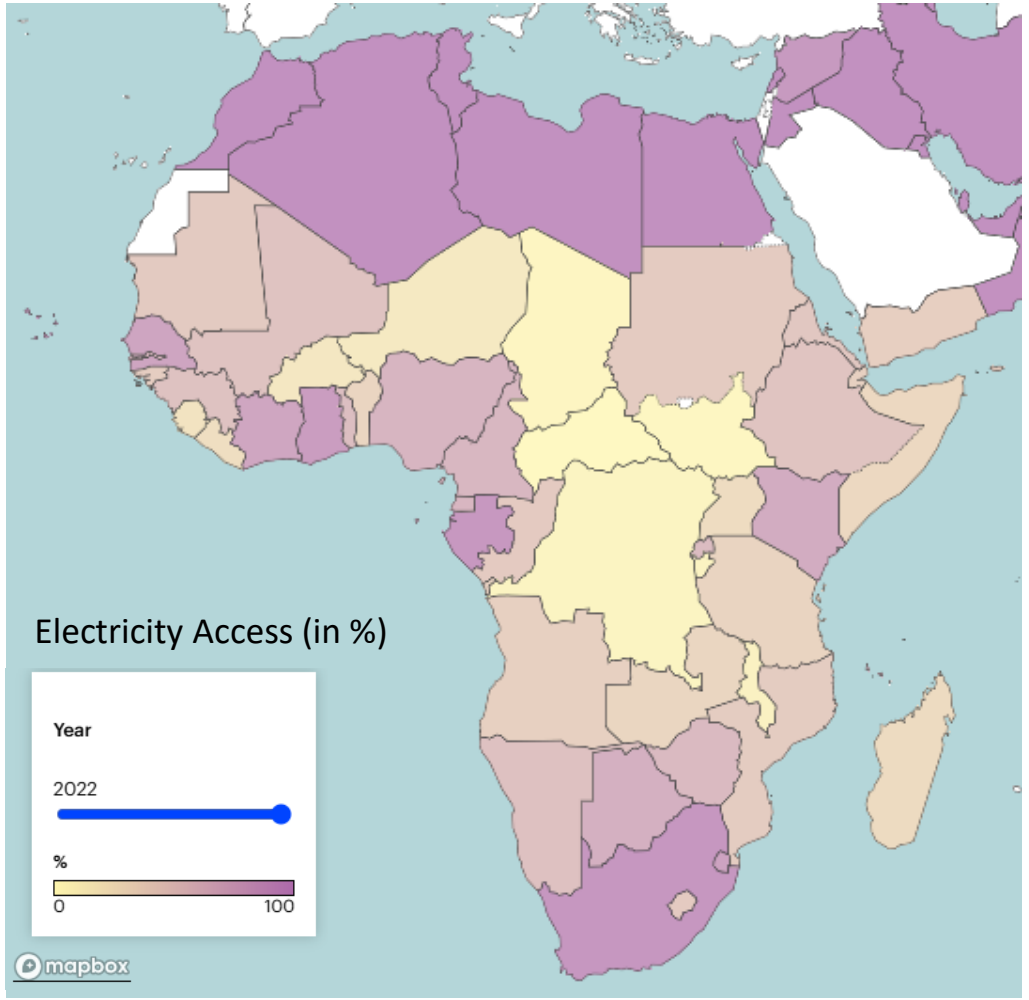
The AU adopted the GEWE Strategy in 2019 to ensure the inclusion of women in Africa's development agenda.

While these policies seek to promote gender inclusion in Africa, we note that **there is no specific continental policy that promotes gender equality specifically in the energy space in Africa**.

GET.transform

Electricity Access

The common definition of electricity access refers to the connectivity, that is the proportion of the population being directly served by either grid-based electricity services or stand-alone systems.



Data: IEA (2024), SDG7: Data and Projections, IEA, Paris https://www.iea.org/reports/sdg7-data-and-projections, Licence: CC BY 4.0

Africa average :
58%

World average:
91 %

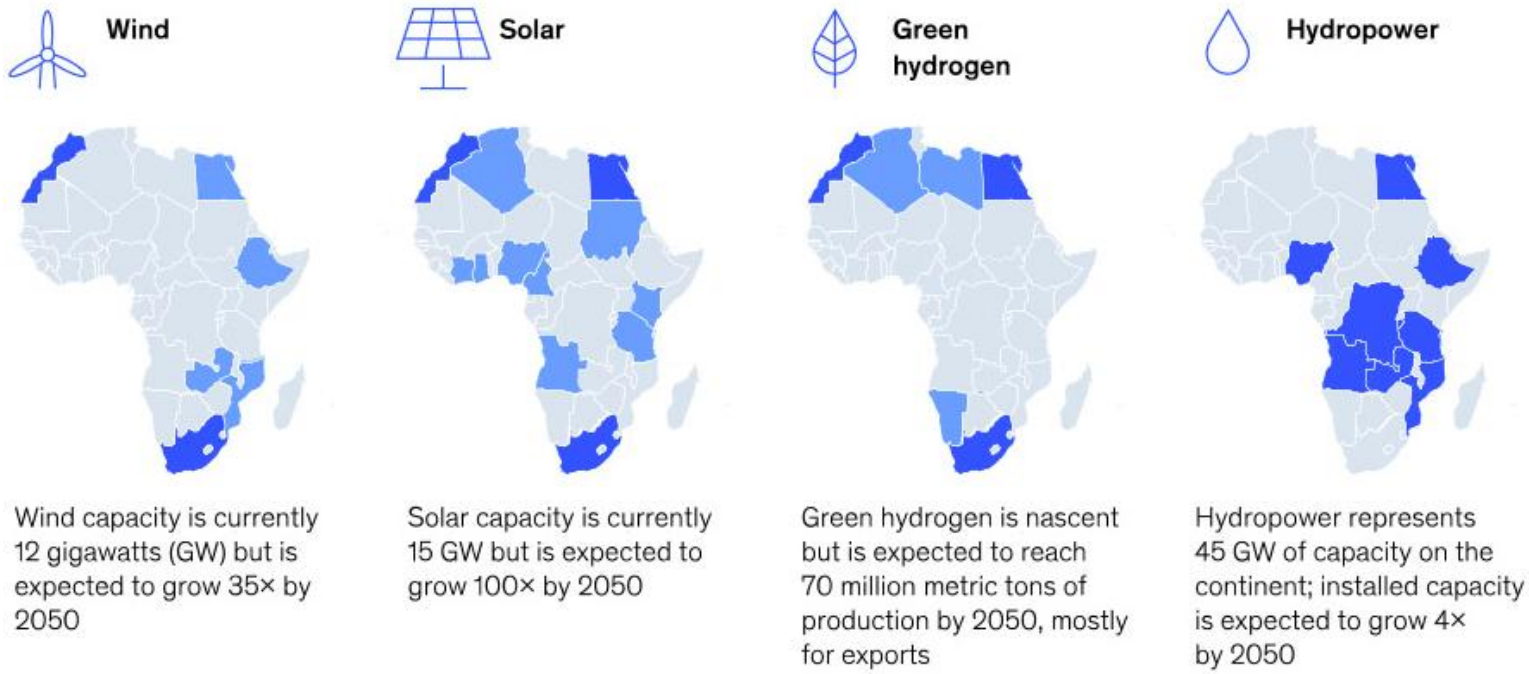
- Major inequalities exist in access to electricity between regions and countries, as well as within countries, particularly evident in rural-urban disparities.
- Excluding South Africa and North Africa, per capita electricity consumption in Africa remains significantly low, ranging from 10 to 50 times below the global average.

GET.transform

Market Segments in Africa

Cumulative Expected Investment by 2050

Market Segment	Renewable Energies	Mini-Grids	Power Transmission & Distribution	Hydrogen[1]
Estimated Market Potential (USD billion)	1,601	213	294	798



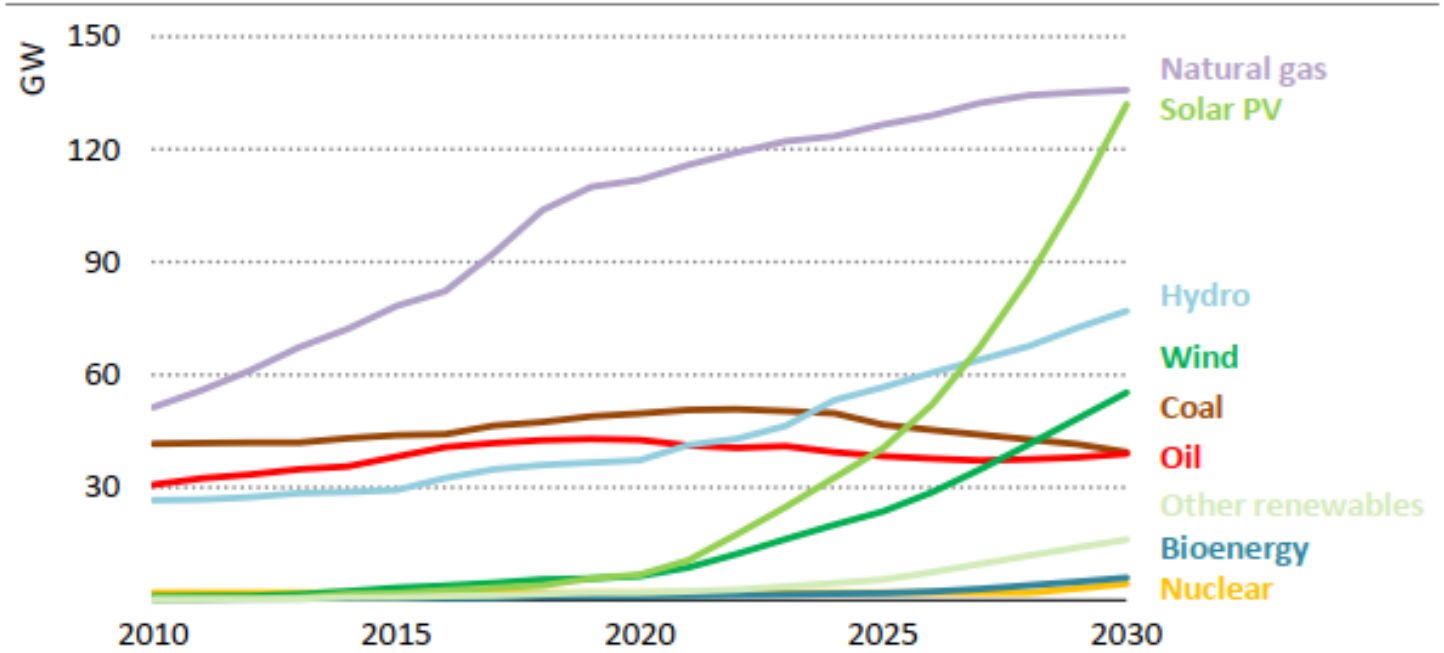
Source: César Augier, Hauke Engel, François Jurd de Girancourt, and Oliver Onyekweli, McKinsey Sustainability - Green energy in Africa presents significant investment opportunities – October 17, 2023. https://www.mckinsey.com/capabilities/sustainability/our-insights/green-energy-in-africa-presents-significant-investment-opportunities

1 Hydrogen assets include the related renewables buld-up (47%), electrolyzer and production assets (31%), and transmission and distribution (22%).

GET.transform

Continental Generation Capacity Projection

2030 Sustainable Africa Scenario based on the IEA's 2030 scenario



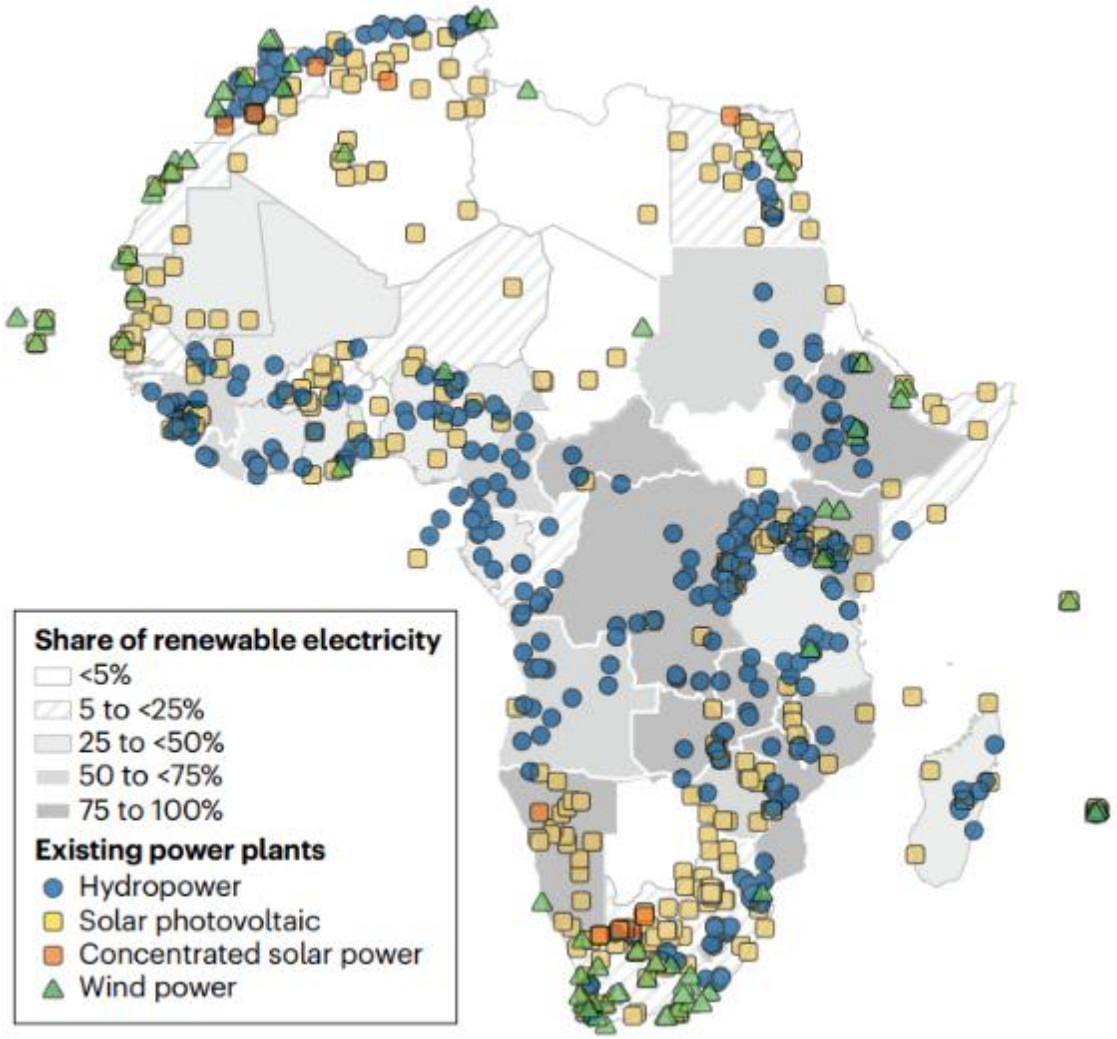
Source: IEA – Africa Energy Outlook 2022

According to the IEA scenario,

- **installed electrical capacity** in Africa is set to **double between 2020 and 2030**, from 260 GW to 510 GW,
- with a preponderance of gas and photovoltaic solar power,
- and hydro also rising slowly after.

GET.transform

Renewable Energy On-Grid Power Plants (as of 2021)

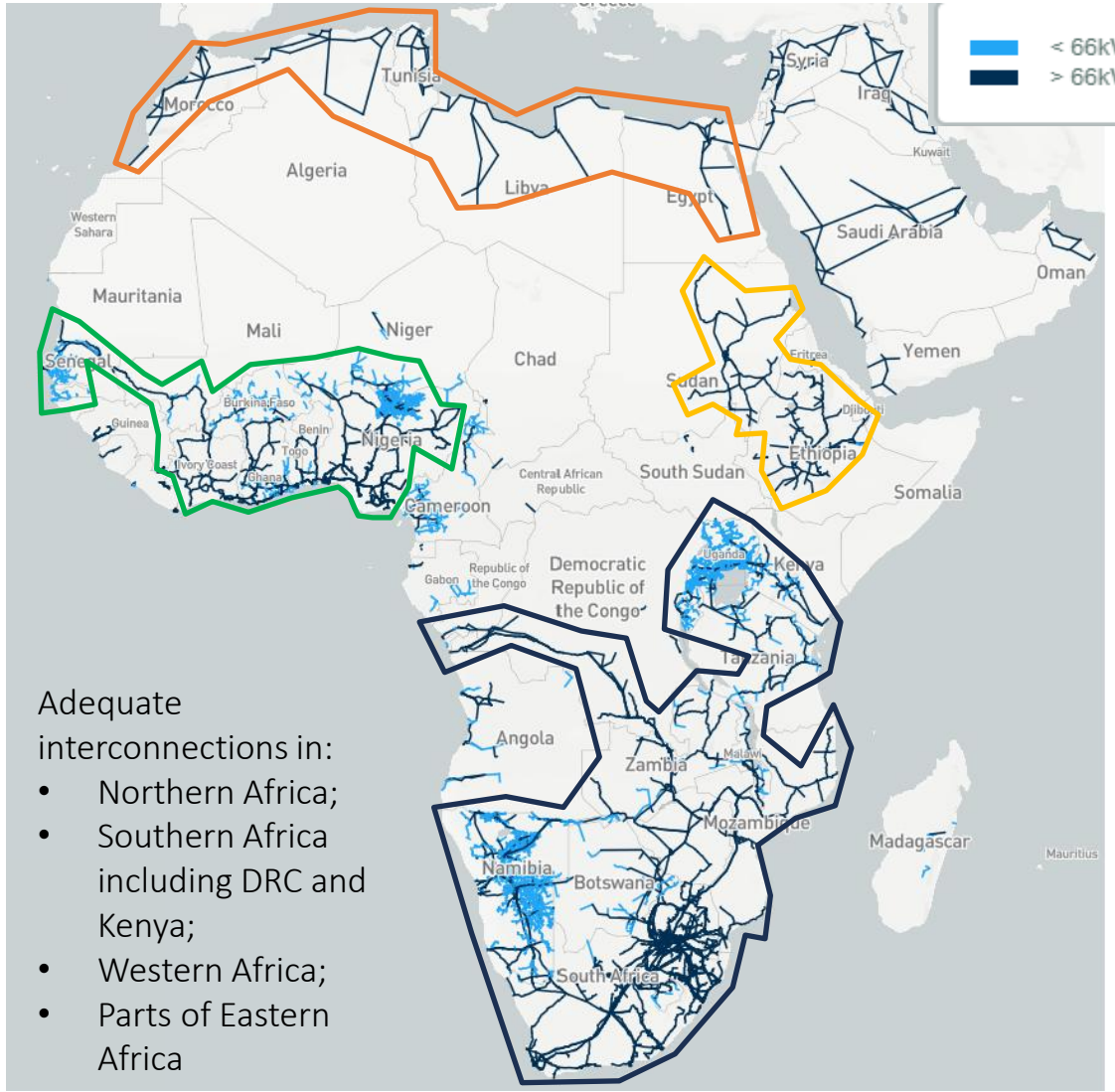


- Over a dozen African countries have installed capacity generating over 50% of their energy from renewable sources, primarily through hydroelectric installations.
- Solar power installations are expanding all over Africa (except in Central Africa).
- Strategic placement in high-wind zones like South Africa, the North Atlantic coast, and the High Plateaux maximises wind farm efficiency.

Source: Peters, R., Berlekamp, J., Kabiri, C. et al. Sustainable pathways towards universal renewable electricity access in Africa. Nat Rev Earth Environ (2024). https://doi.org/10.1038/s43017-023-00501-1 - Data sources: Our World in Data and RePP Africa

GET.transform

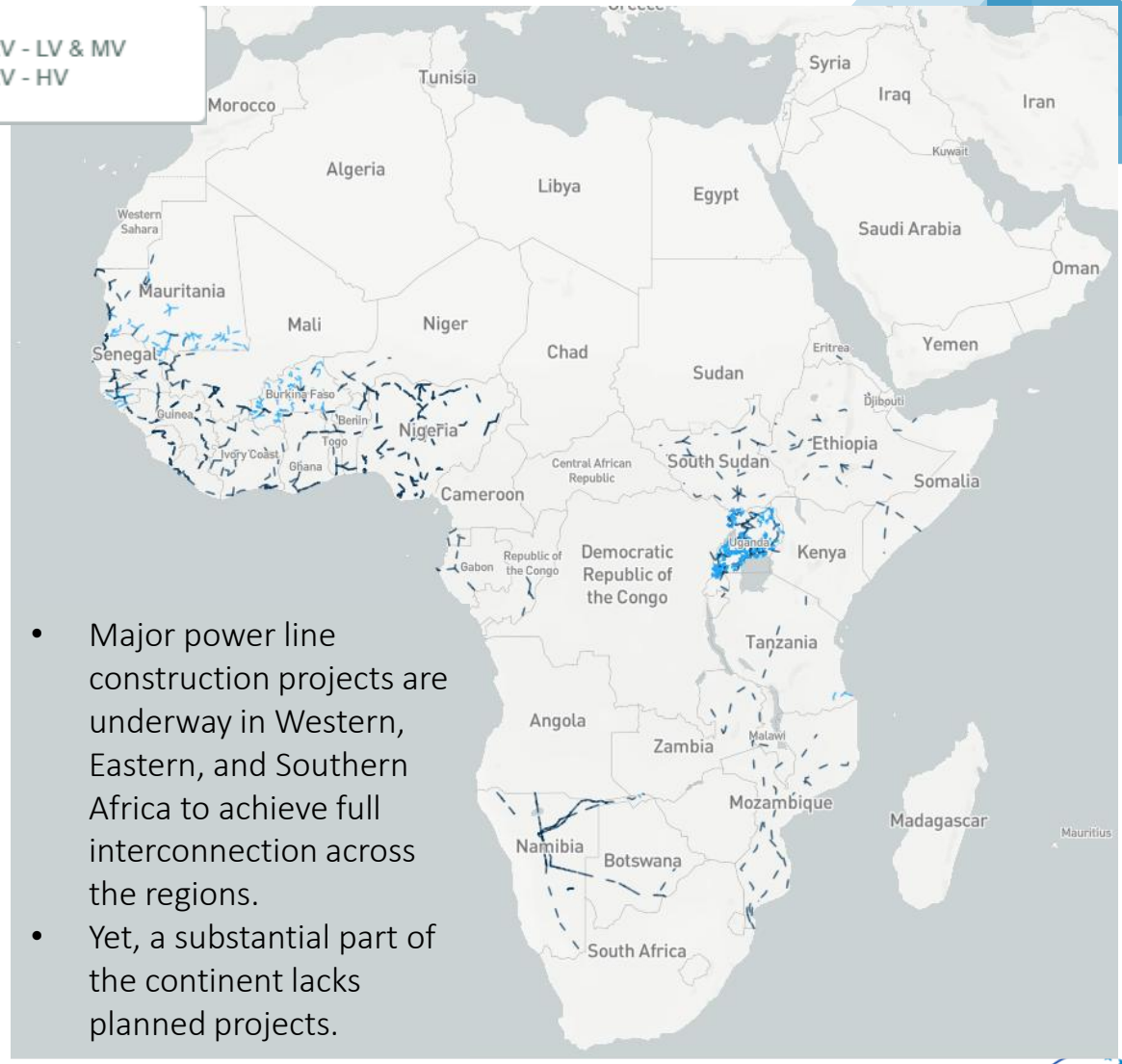
Continental Grids: MV and HV



Adequate interconnections in:

- Northern Africa;
- Southern Africa including DRC and Kenya;
- Western Africa;
- Parts of Eastern Africa

Existing Grid Lines



- Major power line construction projects are underway in Western, Eastern, and Southern Africa to achieve full interconnection across the regions.
- Yet, a substantial part of the continent lacks planned projects.

Planned Grid Lines

Source: Africa Electricity Grids Explorer (2024)

GET.transform

Continental Energy Institutions

African Union Commission (AUC):
Leads continental initiatives for infrastructure development and trade, sets continental vision and strategy, fosters regional integration and mobilises resources.

African Energy Commission (AFREC):
Coordinates, harmonises, and protects energy resources, provides data analysis, develops regulatory frameworks and builds the capacity of energy institutions and professionals.

African Union Development Agency - New Partnership for Africa's Development (AUDA-NEPAD):
Promotes climate change adaptation and renewable energy, promotes rural electrification and provides training and technical assistance.

African Forum for Utility Regulators (AFUR):
Promote regulation through harmonisation, information exchange, and capacity building.

African School of Regulation (ASR):
Aims to be an excellence center for African energy regulation discussions.

Association of Power Utilities of Africa (APUA):
Promotes African electricity sector development and cooperation among power utilities

Regional Economic Communities (RECs)

Eight regional economic communities (excluding AES)

ECOWAS: *Economic Community of West African States*

- Benin
- Burkina Faso
- Cabo Verde
- Côte d'Ivoire
- The Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Liberia
- Mali
- Niger
- Nigeria
- Senegal
- Sierra Leone
- Togo

AMU: *Arab Maghreb Union*

- Morocco
- Algeria
- Tunisia
- Libya
- Mauritania

CEN–SAD: *Community of Sahel–Saharan States*

- Benin
- Burkina Faso
- Central African Republic
- Chad
- Comoros
- Côte d'Ivoire
- Djibouti
- Egypt
- Eritrea
- The Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Kenya
- Liberia
- Libya
- Mali
- Morocco
- Niger
- Nigeria
- Senega
- Sierra Leone
- Somalia
- Sudan
- Togo
- Tunisia

IGAD: *Intergovernmental Authority on Development*

- Djibouti
- Eritrea
- Ethiopia
- Kenya
- Somalia
- South Sudan
- Sudan
- Uganda

COMESA: *Common Market for Eastern and Southern Africa*

- Burundi
- Comoros
- DR Congo
- Djibouti
- Egypt
- Eritrea
- Eswatini
- Ethiopia
- Kenya
- Libya
- Madagascar
- Malawi
- Mauritius
- Rwanda
- Seychelles
- Somalia
- Sudan
- Tunisia
- Uganda
- Zambia
- Zimbabwe

EAC: *East African Community*

- Burundi
- DR Congo
- Kenya
- Rwanda
- South Sudan
- Tanzania
- Uganda

ECCAS: *Economic Community of Central African States*

- Angola
- Burundi
- Cameroon
- Central African Republic
- Chad
- Republic of the Congo
- DR Congo
- Equatorial Guinea
- Gabon
- São Tomé and Príncipe

SADC: *Southern African Development Community*

- Angola
- Botswana
- Comoros
- DR Congo
- Eswatini
- Lesotho
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Namibia
- Seychelles
- South Africa
- Tanzania
- Zambia
- Zimbabwe

GET.transform

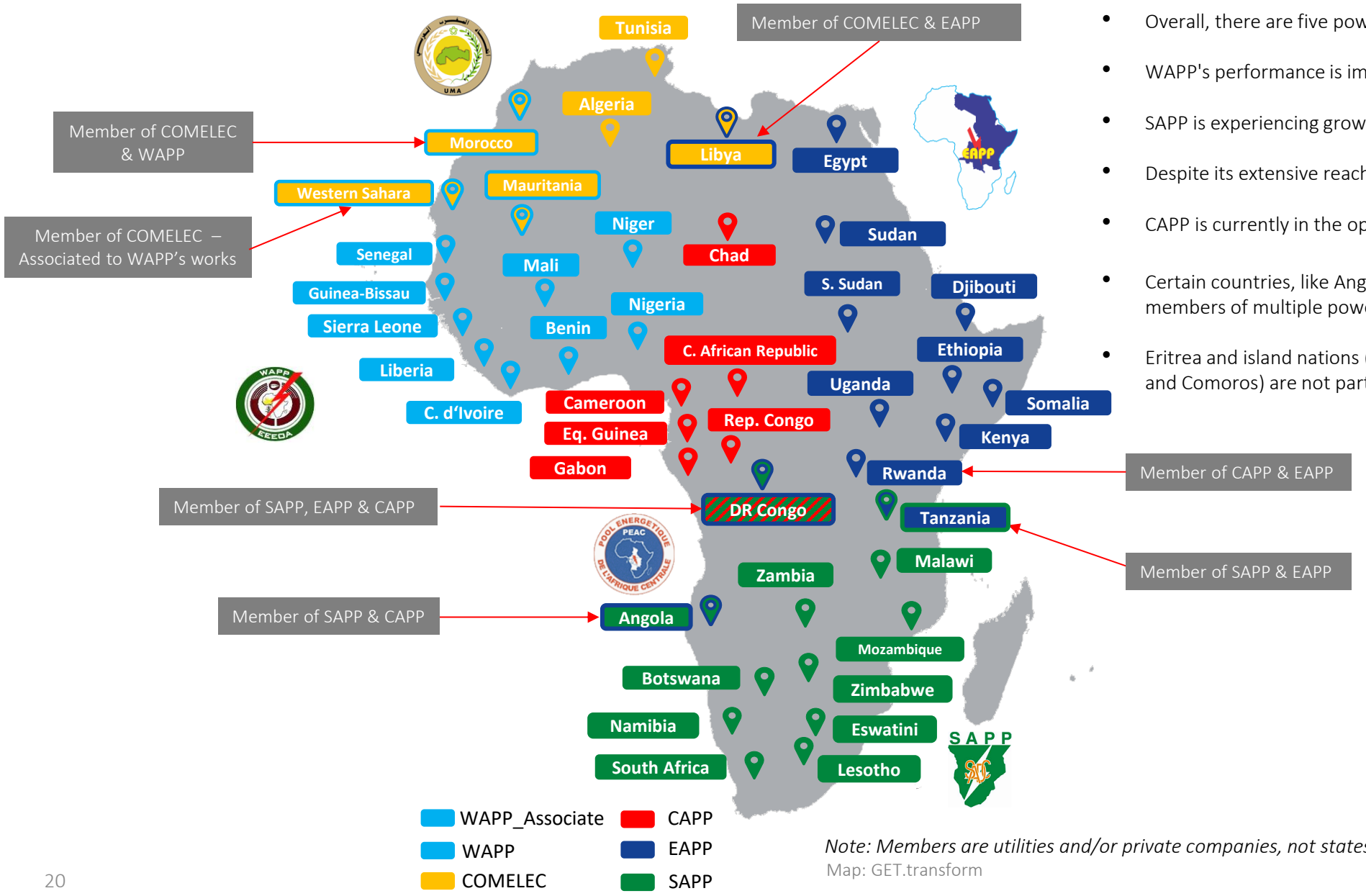
Regional Energy Institutions

Economic Community	AMU	CEN-SAD	COMESA	EAC	ECCAS	ECOWAS	IGAD	SADC
Regulatory Authority	COMELEC		IRB	IRB covers EAC countries	CORREAC (not operationalised)	ERERA		SARERA (on project)
Regulatory Association			RAERESA	RAERESA covers also EAC countries				RERA
Power Pool			EAPP	EAPP covers EAC countries	CAPP	WAPP		SAPP

- Economic communities like AMU, COMESA, EAC, ECCAS, ECOWAS and SADC feature regional regulatory bodies.
- RAERESA, EAPP and IRB are specialised agencies under COMESA.
- Certain member states of AMU, CEN-SAD, COMESA, and IGAD are also part of RCREEE, serving as the technical arm for the League of Arab States, the Energy Department and the Arab Ministerial Council for Electricity (AMCE).

GET.transform

Regional Power Pools



- Overall, there are five power pools in Africa, representing 47 countries.
- WAPP's performance is improving, including its connection with Mauritania.
- SAPP is experiencing growth, both in performance and geographic coverage.
- Despite its extensive reach, EAPP's impact remains limited.
- CAPP is currently in the operationalisation phase.
- Certain countries, like Angola, Burundi, D.R.Congo, Libya and Tanzania are members of multiple power pools.
- Eritrea and island nations (Cape Verde, Madagascar, Mauritius, Seychelles and Comoros) are not part of any power pool.

Note: Members are utilities and/or private companies, not states

Map: GET.transform

Key Stakeholders - Eastern Africa Regulatory Institutions & Power Pool

Burundi
DR of Congo
Kenya
Rwanda
South Sudan
Tanzania
Uganda

Energy Regulators Association of East Africa (EREA)

- **Description**: Multilateral association of national energy regulators of the East Africa Community (EAC) countries.
- **Membership**: National regulatory institutions of 8 member states: Burundi, Democratic Republic of Congo, Kenya, Rwanda, South Sudan, Tanzania, Uganda and Zanzibar.
- **Objectives**: Promotion of regional energy union through the harmonisation of regulations, and coordination of energy projects. Also provision of innovative models for energy efficiency and technologies and tailor-made training through its Energy Regulation Centre of Excellence.
- **Compliance**: Compliance with EREA regulations is **generally voluntary** for regulators of member states, as it operates as a voluntary association of independent national regulators.

Burundi
DR of Congo
Djibouti
Egypt
Ethiopia
Kenya
Libya
Rwanda
Somalia
South Sudan
Sudan
Tanzania
Uganda

Eastern Africa Power Pool (EAPP) and Independent Regulatory Board (IRB)

- **Description**: Regional institutions established to coordinate cross-border power trade, grid interconnection and regulatory integrations among their member countries.
- **Membership**: Burundi, Democratic Republic of Congo, Djibouti, Egypt, Ethiopia, Kenya, Libya, Rwanda, Somalia, South Sudan, Sudan, Tanzania, and Uganda.
- **Objectives**: Reduction of power costs in the region, facilitation of power trade between members, increase of energy availability to citizens of member countries, enhancement of grid security in the region.
- **Compliance:** The EAPP is mandated to **monitor and coordinate trade in electricity** between the the member countries of the EAPP. The IRB is mandated to provide fair and effective regulatory services.

Power Sector Legal Framework – East African Community (EAC)

2001-2005

- East African Legislative Assembly (2001)
- East African Power Pool (EAPP) (2005)

2006-2010

- Regional Strategy on Scaling Up Access to Modern Energy Services (2006)
- Energy Regulators Association of East Africa (EREA) (2008)
- Energy and Environment Partnership (2010)

2011-2015

- East Africa Centre for Renewable Energy and Energy Efficiency (EACREEE) (2016)
- EAC Cross Border Electrification Policy (2018)
- Intergovernmental Authority on Development (IGAD) Energy Pool (2018)

2016-2020

- East Africa Centre for Renewable Energy and Energy Efficiency (EACREEE) (2016)
- EAC Cross Border Electrification Policy (2018)
- Intergovernmental Authority on Development (IGAD) Energy Pool (2018)

2021-present

- Energy Conservation and Efficiency Strategy and Plan (in development)
- Renewable Energy Master Plan (in development)

Source: Renewable Energy (eac.int), Projects and Programmes (eac.int), Other Initiatives (eac.int)

Electricity Sector Reforms – Eastern Africa

PRE-2000

National monopolies with limited regional cooperation

- State-owned vertically integrated utilities.
- Minimal cross-border trade.
- Limited regional institutions.
- Regulatory focus on cost control within monopolies
- Less emphasis on competition and efficiency.

2000-2010

Early reforms and growing regional engagement

- Unbundling of state monopolies.
- Pilot projects introducing IPPs in Ethiopia, Uganda and Kenya.
- EAPP cross-border power exchanges between Uganda & Kenya.
- Collaboration and harmonisation of regulations by EREA (2008).

2010-PRESENT

Accelerating reforms and regional market aspirations

- Growth in off-grid solar solutions, particularly in rural areas.
- Pilot cross-border trading under the Regional Electricity Market by EAPP.
- Continued regulatory harmonisation and capacity building by EREA.
- Launch of the Day-Ahead Market scheduled for 03/2025

GET.transform

Key Stakeholders - Eastern and Southern Africa

Botswana
Egypt
Ethiopia
Kenya
Malawi
Madagascar
Rwanda
Seychelles
Uganda

Regional Association of Energy Regulators for Eastern and Southern Africa (RAERESA)

- **Description**: Specialised agency under the Common Market for Eastern and Southern Africa (COMESA).
- **Membership**: National energy regulators from Egypt, Ethiopia, Kenya, Madagascar, Malawi, Rwanda, Seychelles, Sudan, Uganda and Zimbabwe.
- **Objectives**: Capacity building and information sharing, facilitating energy supply policy and legislation, enhancing inter-regional cooperation, promoting regional energy regulatory cooperation and inter-regional cooperation.
- **Compliance**: Compliance with RAERESA's rules and regulations is **typically voluntary** for regulators of member states, as it operates as a voluntary association of independent national regulators.

Key Stakeholders - Southern Africa Regulatory Institution & Power Pool

Angola
Botswana
Comoros
Democratic Republic of Congo
Eswatini
Lesotho
Madagascar
Malawi
Mauritius
Mozambique
Namibia
Seychelles
South Africa
Tanzania
Zambia
Zimbabwe

Regional Energy Regulators Association of Southern Africa (RERA)

- **Description**: Formal association of electricity/energy regulators in the Southern African Development Community (SADC) region.
- **Membership**: Electricity/energy regulators in the Member States of the SADC region.
- **Objectives**: Influencing developments in the energy sector, promoting access to affordable energy services, enhance the capacity of regulators, facilitating the development of a regional energy market and compatible regulatory frameworks.
- **Compliance**: RERA deliberates **and makes advisory recommendations** to RERA members on issues that fall outside national jurisdiction.

Angola
Botswana
Democratic Republic of Congo
Eswatini
Lesotho
Malawi
Mozambique
Namibia
South Africa
Tanzania
Zambia
Zimbabwe

Southern African Power Pool (SAPP)

- **Description**: Cooperation of national electricity companies in Southern Africa under the Southern African Development Community (SADC).
- **Membership**: Botswana, Democratic Republic of Congo, Eswatini, Lesotho, Mozambique, Namibia, South Africa, Zambia, Zimbabwe. Angola, Tanzania and Malawi are not yet electrically interconnected and are called “Non-Operating Members.”
- **Objectives**: Coordinating the planning and operation of the electric power system among member utilities.
- **Compliance:** Compliance with SAPP rules is **compulsory for member utilities** operating within the SAPP market, as adherence ensures smooth functioning of the regional electricity network and promotes fair competition.

GET.transform

Power Sector Legal Framework – Southern African Development Community (SADC)

1995-1999

- Southern African Power Pool (1995)
- The SADC Protocol on Energy (1996)
- SADC Energy Cooperation Policy and Strategy (1996)
- SADC Energy Action Plan (1997)

2000-2010

- SADC Energy Activity Plan (2000)
- SADC Regional Energy Policy (REP) (2006)
- Regional Energy Access Strategy and Action Plan (2010)

2011-2015

- Regional Infrastructure Development Master Plan and the Energy Sector Plan (2012)
- SADC Industrialisation Strategy & Roadmap (2015)
- SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) (2015)

2016-present

- Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP) (2017)
- SADC Industrial Energy Efficiency Programme (2018)
- SADC Regional Indicative Strategic Development Plan (RISDP) 2020-2030 (2020)
- SADC Vision 2050 (2020)

Source: Renewable Energy (eac.int), Projects and Programmes (eac.int), Other Initiatives (eac.int)

Electricity Sector Reforms – Southern Africa

PRE-2000

National monopolies with limited regional cooperation

- Dominant state-owned utilities.
- Limited regional trade.
- SAPP (1995) facilitated power system coordination, planning & operation.
- Regulations fragmented and national-centric.

2000-2010

Early reforms and growing regional engagement

- Liberalisation of electricity markets.
- Adoption of the Regional Electricity Policy and Strategy in 2005 by SADC.
- RERA established in 2002 to facilitate collaboration and harmonise regulations.

2010-PRESENT

Accelerating reforms and regional market aspirations

- Regional Electricity Market (REM) Pilot Phase launched in 2020.
- Continued market reforms in South Africa, Namibia, and other countries.
- Investments in grid modernisation and renewable energy projects.
- The SAPP manages regional grid & cross-border power exchanges.

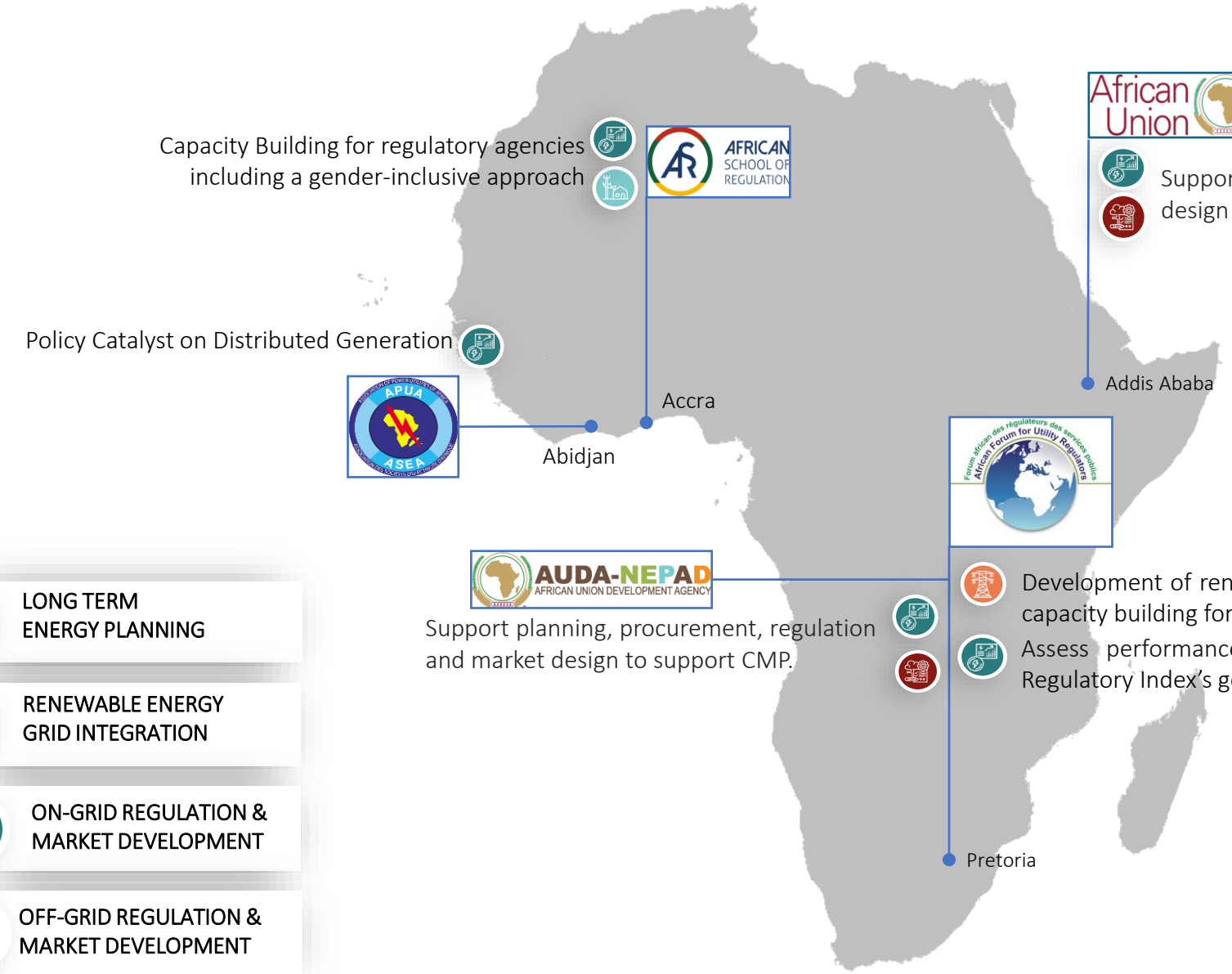
GET.transform

GET.transform Advisory Services

Overarching	Capacity Building			
	Technical Assistance			
	Gender Equality and Inclusion			
Work Packages	Governance & Consultation	Grid Codes	Renewable Energy Competitive Procurement	Electrification Planning & Siting
	Scenarios & Modelling	Transmission System Planning and Operation	Renewable Energy Distributed Generation (DG)	Mini-Grid Frameworks
	Adoption & Communication	Distribution System Planning and Operation	Power Market Design	Standalone Systems Frameworks

GET.transform

Collaboration Partners & GET.transform Workstreams



Capacity Building for regulatory agencies including a gender-inclusive approach

AFRICAN SCHOOL OF REGULATION

Policy Catalyst on Distributed Generation

APUA ASEA

Abidjan

Accra

African Union

Support planning, procurement, regulation and market design to support AfSEM.

Addis Ababa

Forum africain des régulateurs des services publics
African Forum for Utility Regulators

AUDA-NEPAD
AFRICAN UNION DEVELOPMENT AGENCY

Support planning, procurement, regulation and market design to support CMP.

Development of renewable energy technologies framework and guidelines and capacity building for stakeholders.

Assess performance-based regulation's impact on utilities per Electricity Regulatory Index's goals

Pretoria

LONG TERM ENERGY PLANNING

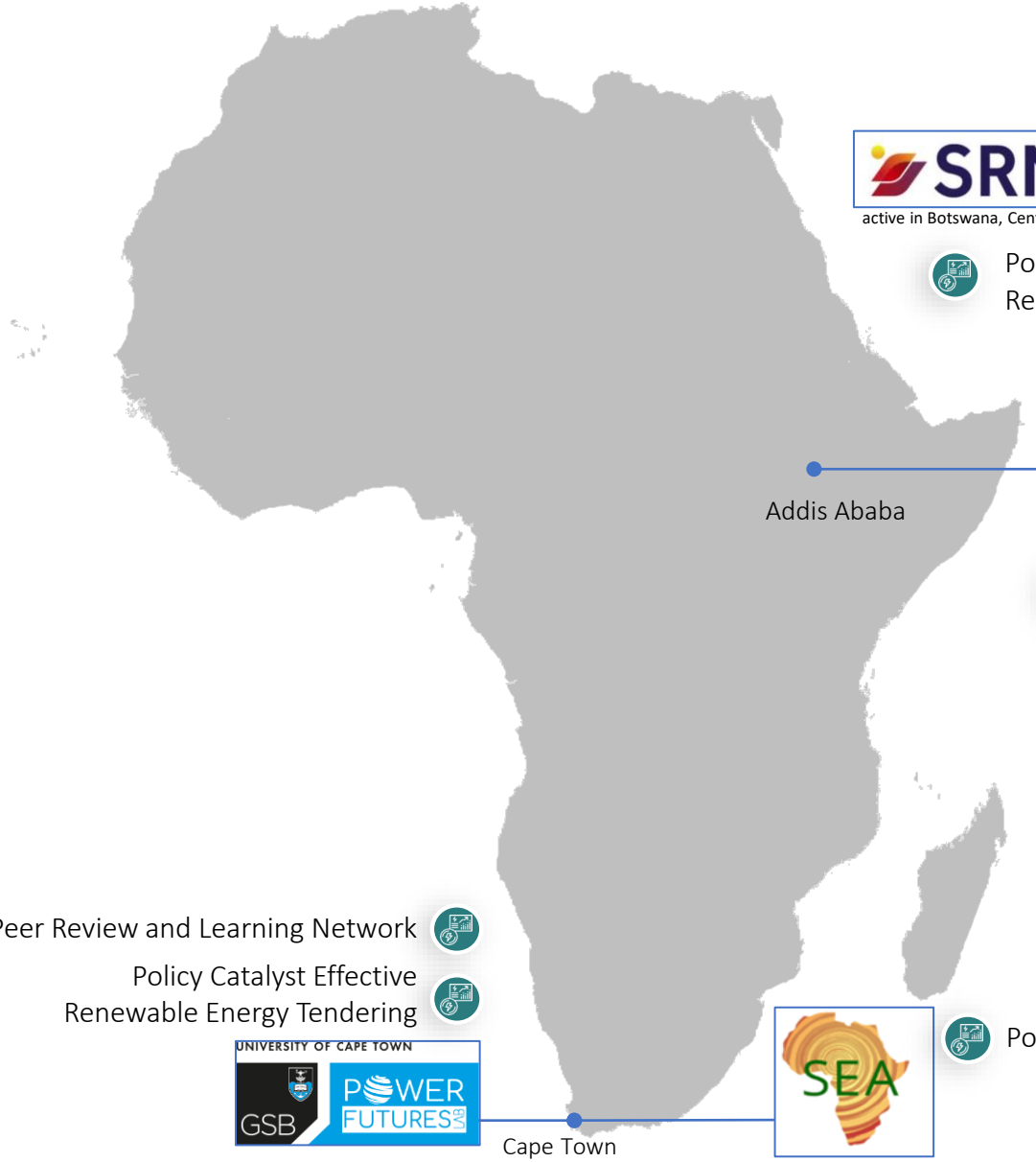
RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

GET.transform

Collaboration Partners & GET.transform Workstreams



SRMI Sustainable Renewables Risk Mitigation Initiative

active in Botswana, Central African Republic, DRC, Kenya, Mali, Namibia

Policy Catalyst Effective Renewable Energy Tendering

Addis Ababa

IRENA International Renewable Energy Agency

Support the EAPP with capacity building on the update of the regional Masterplan

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

Peer Review and Learning Network

Policy Catalyst Effective Renewable Energy Tendering

UNIVERSITY OF CAPE TOWN GSB POWER FUTURES LAB

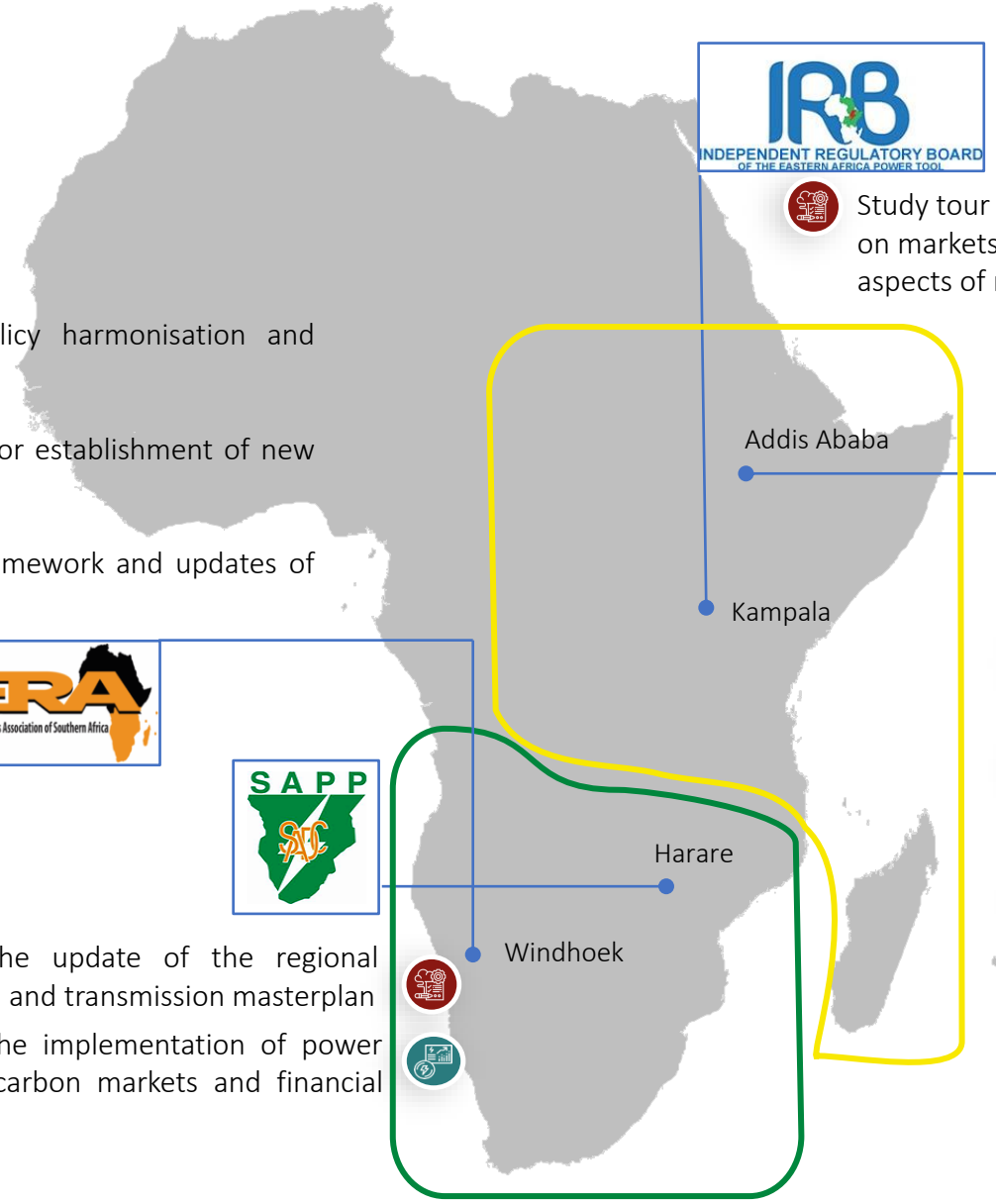
Cape Town

SEA

Policy Catalyst on Distributed Generation

GET.transform

Targeted Eastern & Southern Africa Institutions & GET.transform Workstreams



Study tour to facilitate peer exchange between SAPP and EAPP on markets monitoring and surveillance function and market aspects of regional energy markets

Support regional regulatory and policy harmonisation and national framework adaptation.

Support legal and regulatory aspects for establishment of new market structures in SAPP.

Support with harmonised licensing framework and updates of the interconnection code.

Support with capacity building on the update of the regional Masterplan.

Support the EAPP Power Balance Statement.

Support the EAPP Market Handbook - Centralized trade. Annual Market Report tracking progress toward a regional electricity market, initially focusing on bilateral trade and later including centralized EAPP trade.

Support the update of the regional generation and transmission masterplan

Support the implementation of power markets, carbon markets and financial markets.

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

GET.transform

State of Play Workstream #1: Long Term Energy Planning

LONG TERM ENERGY PLANNING | RENEWABLE ENERGY GRID INTEGRATION | ON-GRID REGULATION & MARKET DEVELOPMENT | OFF-GRID REGULATION & MARKET DEVELOPMENT

Highlights

- **Fragmented Planning:** Energy planning strategies vary widely across regions, reflecting diverse approaches without a fully coordinated continental framework.
- **Limited Planning Tools:** Advanced tools, such as GIS platforms, are still underutilised, influencing planning capacities.
- **Progressive Inclusion Integration:** There is a growing focus on inclusivity, such as gender considerations, in national strategies, recognised as increasingly important.
- **Partial Alignment with CMP:** Some regions are gradually aligning their strategies with the Continental Master Plan (CMP), though this remains in the early stages of adoption.

Ongoing and Potential Support Projects

- **CMP/AfSEM:** Support on the CMP Phase III e.g. reviewing existing independent transmission project (IPT), alignment of national and regional masterplans with the CMP.
- **EAPP:** Support with Capacity Building on the update of the regional generation and transmission Masterplan.
- **SAPP:** Support the update of the regional generation and transmission masterplan.

CHALLENGES

- **Data Gaps and Quality Issues** – Unreliable and outdated data on energy demand, consumption, and renewable potential complicates decision-making, incomplete data on infrastructure.
- **Lack of Data Standardisation** – Inconsistent methodologies across agencies lead to fragmented national and regional energy planning.
- **Governance structure** – Lack of structured and inclusive process with clearly identified stakeholders
- **Limited Integration and Interoperability** – Poor integration with GIS, demographic data, and national databases reduces coordination and comparative analysis.
- **Infrequent Model Updates** – Resource constraints prevent regular updates, making long-term strategies outdated and ineffective.
- **High Costs of LTEP Tools** – Advanced tools (e.g., PLEXOS, TIMES) have costly licenses; even open-source tools (e.g. OSeMOSYS, PYPSA, EnergyPLAN) require investment in training and customisation.

GET.transform

State of Play Workstream #2: Renewable Energy Grid Integration

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

Highlights

- **Expansion of Distributed Generation:** Renewable distributed generation, especially solar and wind, is rapidly growing, with substantial private sector support.
- **Cross-Border Trade Initiatives:** Renewable energy corridors, like the Green Energy Corridor, are emerging to connect regions and facilitate energy trade.
- **Capacity Building:** Regions notably through regional associations like SARERA are actively enhancing skills and infrastructure to support efficient renewable integration into grids.
- **Evolving Regulatory Frameworks:** Regulators are progressively adapting existing frameworks to include bi-directional metering and renewable-specific grid codes.

Ongoing and Potential Support Projects

- Development of a renewable energy framework, including technical standards, grid stability measures, and capacity building for regulators and operators.
- Harmonisation, review or update of grid codes e.g. national and regional grid codes.
- Conducting Variable Renewable Energy hosting capacity studies.

CHALLENGES

- **Harmonised Grid Codes** –lack of harmonised and updated grid codes on a national and regional level.
- **Limited Hosting Capacity Studies** – Inadequate studies on grid hosting capacity lead to congestion, instability, and inefficient renewable energy deployment.
- **Regional Infrastructure** – lacking regional infrastructure to trade Variable Renewable Energy.
- **Slow Execution of Renewable Projects** – Bureaucratic delays, lack of financing, regulatory frameworks and policy inconsistencies slow project implementation.
- **Intermittency Management Challenges** – Limited grid flexibility, storage solutions, and demand-side management impact the reliability of the grid with increasing shares of Variable Renewable Energy.

GET.transform

State of Play Workstream # 3: On Grid Regulation & Market Development 1/2

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

Highlights

- **Development of National Frameworks:** Each region is advancing at its own pace in developing on-grid regulatory frameworks.
- **Continental Market Vision:** Africa is moving toward a unified market vision through the Africa Single Electricity Market (AfSEM), which is in its early stages.

Ongoing and Potential Support Projects

- **AUDA-NEPAD:** Support planning, procurement, regulation and market design to support CMP.
- **AUC:** Support planning, procurement, regulation and market design to support AfSEM.
- **SAPP:** Support on the establishment of power, carbon, financial markets and ancillary markets.
- **EREA, IRB:** Support with harmonised licensing framework and updates of the interconnection code.
- **RERA:** Support the approved framework for the establishment of SAEREA as a regional energy regulatory authority. Support with harmonized licensing framework and updates of the interconnection code.

CHALLENGES

- **Regulatory Frameworks** – Inconsistent policies, lack of enforcement, and slow regulatory updates hinder regional market growth.
- **Lack of Harmonised Frameworks** – Disjointed national and regional regulations create barriers to regional electricity market integration.
- Regional integration requires balancing individual national energy security with collective cooperation.
- **Lack of Regional Market Integration** – Weak interconnections and regulatory misalignment hinder cross-border electricity trade.
- **Regulators** - Regional electricity markets need strong, independent regulators to ensure fair competition and efficient operations. While initiatives like IRB and SARERA are promising, they require further development and support to effectively address regional challenges.

GET.transform

State of Play Workstream #3: On Grid Regulation & Market Development 2/2

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

Highlights

- **Regional Regulatory Associations:** Associations like SARERA support regional cooperation, focusing on harmonisation and dialogue, though they lack enforcement powers.
- **Regional Market Structures:** Some regions are beginning to standardise market structures and tariffs to improve interconnection and energy trade fluidity.

Ongoing and Potential Support Projects

- **AFUR:** Supporting the Policy Catalyst on Distributed Generation.
- **PFL:** Capacity Building for CEOs of regulatory agencies (PRLN), Policy Catalyst on effective Renewable Energy Tendering.
- **ASR:** Capacity Building for regulatory agencies including a gender-inclusive approach.
- **SEA:** Policy Catalyst on Distributed Generation.

CHALLENGES

- **Underdeveloped Regional and Continental Markets** – Electricity markets are still evolving and require significant investment and capacity building.
- **High Investment and Political Will Required** – The CMP and AfSEM depend on strong national and regional commitment to become operational.
- **Fragmentation in Regulatory Bodies** – Regional and continental regulators compete for funding and membership, causing inefficiencies and slowing policy harmonisation.
- **Overlap Between RAERESA and EREA** – The overlapping mandates of RAERESA (Regional Association of Energy Regulators for Eastern and Southern Africa) and EREA (Eastern Africa Power Pool Regulatory Authority) may lead to duplication of efforts and inefficiencies.
- **Lack of Coordination in Policy and Regulation** – Weak alignment between national, regional, and continental frameworks hinders effective electricity market integration.

GET.transform

State of Play Workstream #4: Off Grid Regulation & Market Development

LONG TERM ENERGY PLANNING

RENEWABLE ENERGY GRID INTEGRATION

ON-GRID REGULATION & MARKET DEVELOPMENT

OFF-GRID REGULATION & MARKET DEVELOPMENT

Highlights

- **Growth of Mini-Grids:** Mini-grids are emerging as a viable solution for rural electrification in several African countries, increasingly integrated into national strategies.
- **Varied Mini-Grid Regulation:** Mini-grid regulation varies across regions, with some well-established frameworks and others still in development.
- **Focus on Rural Electrification:** Rural electrification is now a central focus in energy policies across many African countries.
- **Role of Rural Electrification Agencies:** These agencies play a key role in implementing off-grid and mini-grid projects, though they often operate independently from regional initiatives.

Ongoing and Potential Support Projects

- **AFUR:** Support African model mini-grid regulations, with a focus on implementation of the regulation and tariff tools with national regulators.
- **ASR:** Capacity Building for regulatory agencies including a gender-inclusive approach.

CHALLENGES

- **Viewed as Pilot Projects** – Most countries regulate mini-grids as small-scale pilots, discouraging private investment.
- **Unclear Regulatory Pathways** – Many regulators lack proven frameworks to scale mini-grids effectively.
- **Uneven Regulatory Experience** – Some countries have advanced policies, but most remain inexperienced.
- **Limited Integration** – Mini-grids are not fully incorporated into national and regional electrification plans.
- **Weak Regional Coordination** – The CLUB-ER initiative, meant to support collaboration, is inactive due to funding and engagement issues.
- **Grid vs. Decentralisation** – Balancing investments between centralised grids and decentralised solutions remains a challenge.

GET.transform

Status of Technical Assistance

LONG TERM ENERGY PLANNING

- Support AfSEM and CMP: e.g. CMP Phase III with reviewing existing independent transmission project (IPT), alignment of national and regional masterplans with the CMP.
- Support EAPP with Capacity Building on the update of the regional generation and transmission Masterplan.
- Support SAPP with the update of the regional generation and transmission masterplan.

RENEWABLE ENERGY GRID INTEGRATION

- Development of a renewable energy framework, including technical standards, grid stability measures, and capacity building for regulators and operators.
- Harmonisation, review or update of grid codes e.g. national and regional grid codes.
- Conducting variable Renewable Energy hosting capacity studies.

ON-GRID REGULATION & MARKET DEVELOPMENT

- AUDA-NEPAD: Support planning, procurement, regulation and market design to support CMP.
- AUC: Support planning, procurement, regulation and market design to support AfSEM.
- Support SAPP on the establishment of power, carbon, financial markets and ancillary markets.
- EREA, IRB: Support with harmonised licensing framework, updates of the interconnection code and capacity building on market surveillance & monitoring. .
- RERA: Support the development of border transmission guidelines aligned with the Independent Power Transmission model.
- AFUR: Evaluate the impact of performance-based regulation on utilities' performance, aligned with the Electricity Regulatory Index's goals.
- PFL: Capacity Building for CEOs of regulatory agencies (PRLN), Policy Catalyst on effective Renewable Energy Tendering.
- ASR: Capacity Building for regulatory agencies including a gender-inclusive approach.
- SEA: Policy Catalyst on Distributed Generation.

OFF-GRID REGULATION & MARKET DEVELOPMENT

- AFUR: Support African model mini-grid regulations, with a focus on implementation of the regulation and tariff tools with national regulators.
- ASR: Capacity Building for regulatory agencies including a gender-inclusive approach.

Activities supported by GET.transform: Ongoing | Planned | Completed | Not Covered

GET.transform

3

AFRICA REGIONAL WINDOW SETUP

Alignment with other Development Partners

EU-SUPPORTED

GET.transform	GET.invest	AEEP	CEPA	AfDB	World Bank	IRENA	UN
Energy Sector Transformation	Private Sector Mobilisation	Policy Dialogues and Knowledge Hub	TA to AU Energy Institutions	Energy Infrastructure	Renewable energy deployment	Policy frameworks, and capacity-building	Energy Policy and Finance
Providing technical assistance to the public sector. • Long-Term Energy Planning. • Renewable Energy Grid Integration. • On-Grid and Off-Grid Regulation and Market Development.	Mobilising private sector investment in renewable energy project.	Integrated political dialogues supporting Africa EU Green Energy Initiative. Capacitating African Institutions. Supports implementation of joint African-European initiatives.	Supports cross-border energy cooperation, grid development, and the rollout of renewable energy and efficiency initiatives in Africa. It advances AfSEM, CMP, and AfEES through technical assistance and policy advice, promoting investment while addressing climate, gender, and health.	Provides funding support through grants for on grid electrification projects. Supports the harmonisation of regulatory frameworks to facilitate electricity exchanges among COMESA member countries.	Supporting SADC's regional grid code development. Supporting COMESA's infrastructure finance facility. Support to EAPP on: • Update of the EAPP master plan study (completed), • Renewable energy resource assessment and mapping, and capacity strengthening initiatives, • Capacity strengthening for power pool participants, and EAPP's grid interconnection projects, • Development of the Ethiopia-Kenya High Voltage transmission line.	Supporting renewable energy market development in the SADC region through capacity building of SMEs. Contributing to the SADC Renewable Energy Entrepreneurship Support Facility. Africa Clean Energy Corridor, to accelerate the development of RE potential and cross-border trade in the Eastern and Southern Africa region.	**UNIDO:** Development of the EACREEE & SACREEE (*East African/*SADC *Centre of Excellence for Renewable Energy and Energy Efficiency).* **SEforALL**: Supports governments with energy policy, finance mobilisation, and clean cooking solutions.

EU: European Union, AEEP: Africa-EU Energy Partnership, AfDB: African Development Bank, IRENA: International Renewable Energy Agency, UN: United Nations, CEPA:Continental Energy Programme in Africa.

GET.transform

Africa Regional Window Setup

Region

- 1 x Regional Coordinator based in Ethiopia (Secondment to the Power Pool)

GET.transform HQ

- 1 x Global Partnerships Head for overarching RW strategy support.
- 1 x Advisory Services Focal Point for LTEP and RE-Integration.
- 1 x Advisory Services Focal Point Regulation Market Development.

Technical Assistance Partners

- Expert Consulting Pool for LTEP and RE Grid Integration.
- Expert Consulting Pool for Regulation and Market Development.

Thank You for Your Attention

Ene Sandra Macharm
Head of Global Partnerships
ene.macharm@get-transform.eu
+49 172 536 4825

Our Website: **www.get-transform.eu**

Follow us: @GET-transform