

Eswatini Country Window:

Energy System Transformation Outlook (ESTO)



GET.transform is co-funded by



14 August 2024

Contents

1

ABOUT US

GET.transform

Our Technical Approach

2

ESWATINI ESTO

Generation Mix and Installed Capacity

Stakeholders

Market Structure, Regulatory Framework and Energy Policies

Assessment Framework

Identified Priorities

Proposed Support Projects

3

COUNTRY WINDOW

Country Window Set-Up

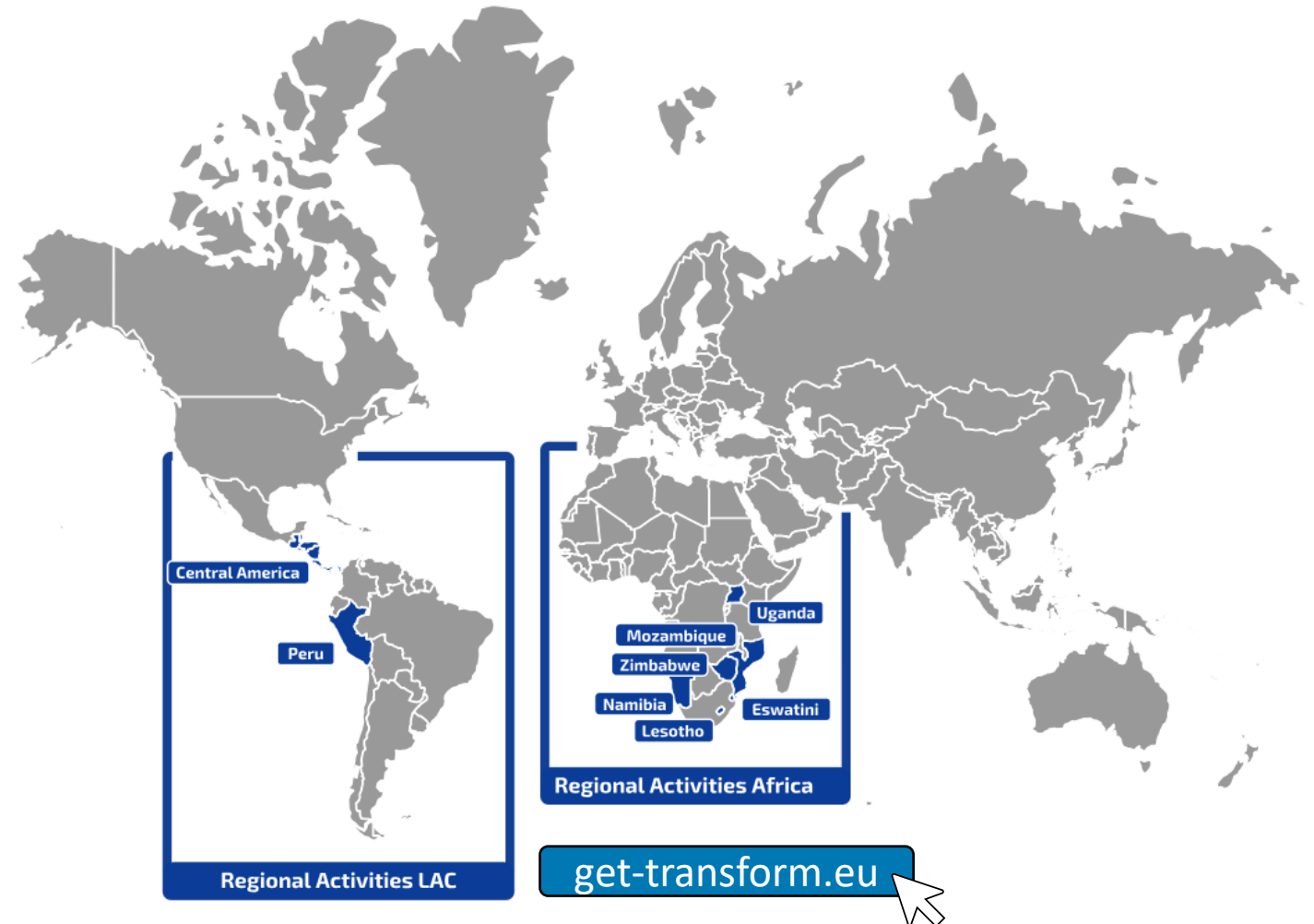
1

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 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

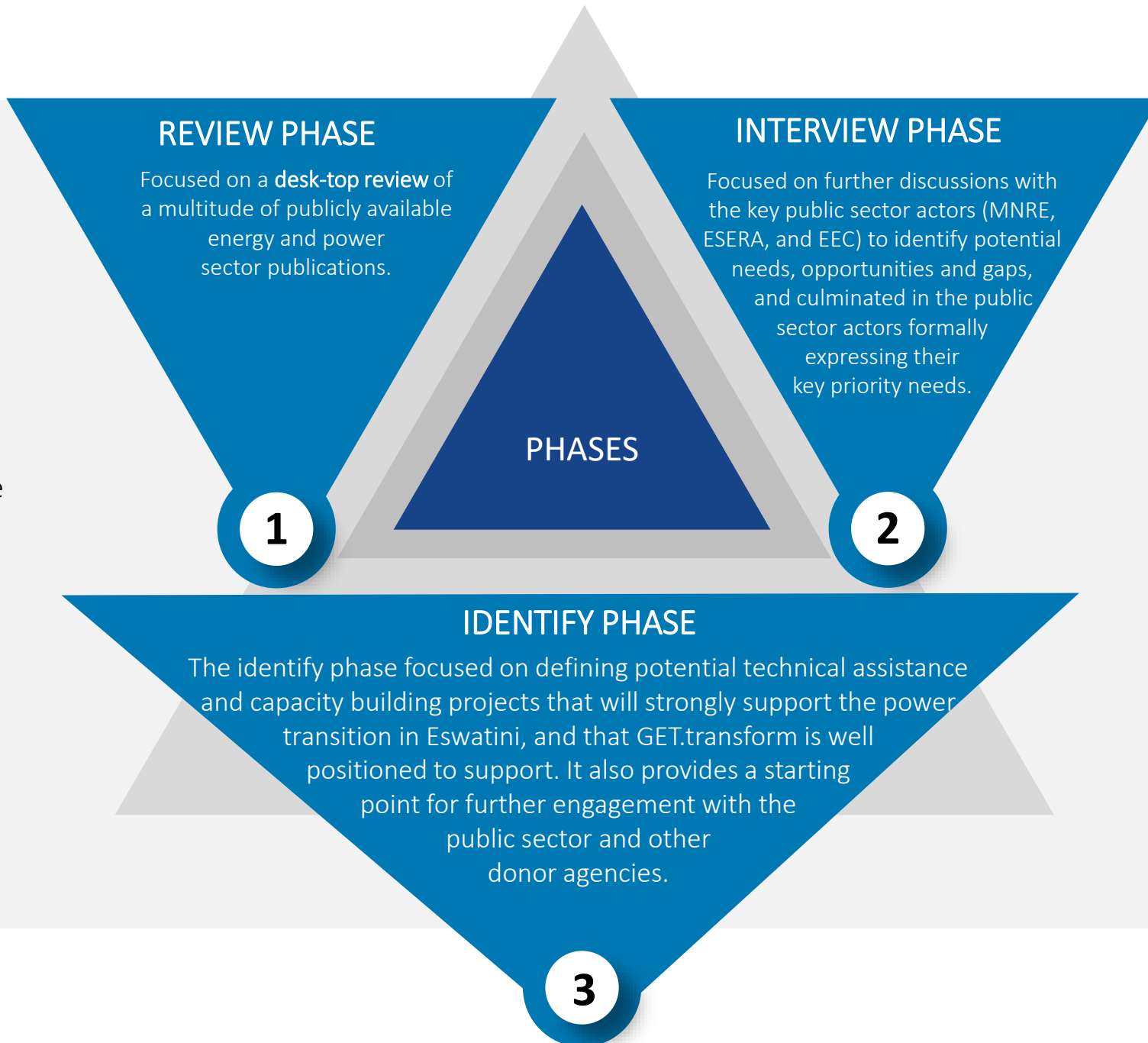
Supporting **off-grid electrification planning** and data management frameworks
Developing mini-grid **regulatory frameworks** and technical standards and designing award mechanisms for **procuring off-grid energy**

2

ESWATINI ESTO

Foreword

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

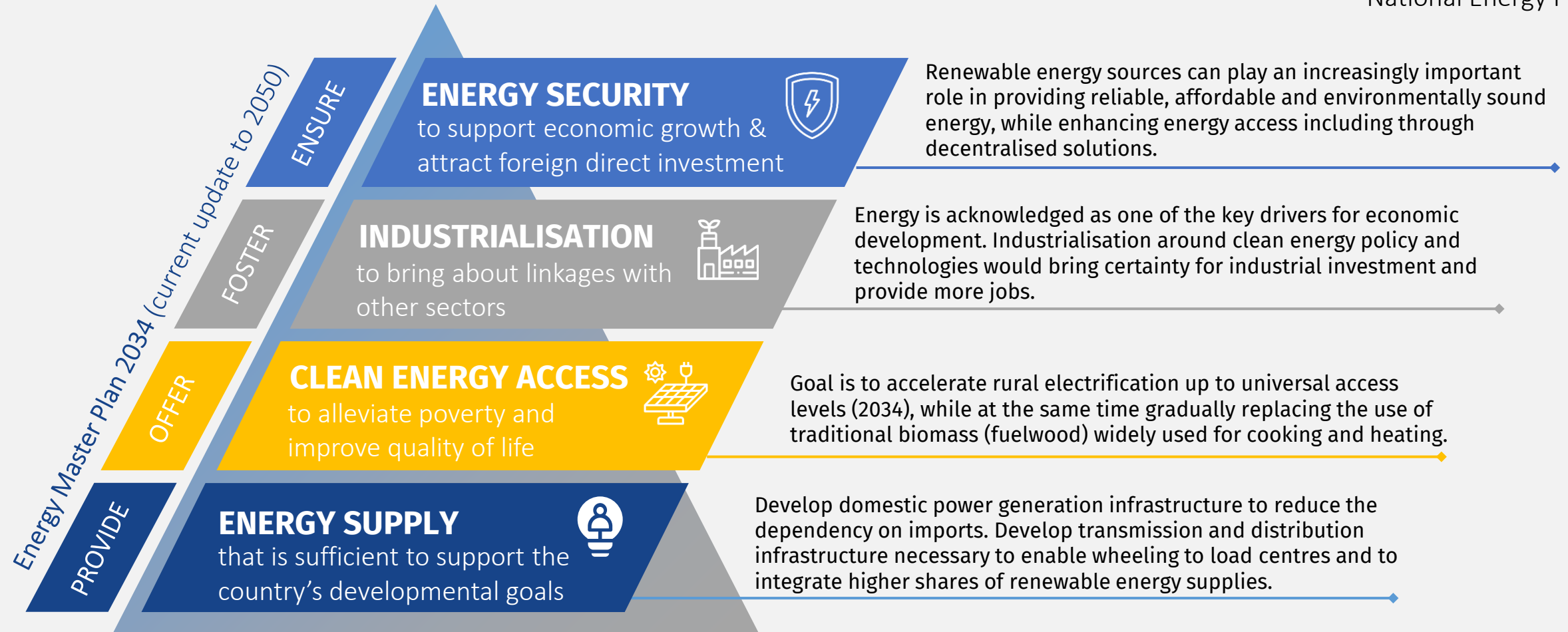


The ESTO is not a formula of what should be done by the country or the public sector actors.

The ESTO is a means of obtaining feedback to enrich our understanding of the power sector in Eswatini and to identify support activities and synergies with other donor and development agencies.

Eswatini's Energy Vision

“To meet the energy needs of the country in a sustainable manner that contributes to economic growth and well-being of the population”.
National Energy Policy



Status of Energy Sector Transformation in Eswatini

The electricity supply industry in Eswatini has undergone changes both from a policy and regulatory point of view.

Changing global trends towards liberalised energy markets, security of supply, achieving efficiencies, affordability, and access to electricity supply are the most important factors that introduced a change in the Eswatini policy trajectory.

Overall, the electricity supply industry in Eswatini can be broadly defined as an industry in transition, informed both by policy imperatives and regulatory reform.

Key policy instruments includes the 'Independent Power Producer Policy' of 2016 and the 'National Energy Policy' of 2018. (For more details see slide on Regulation and Energy Policy Instruments)

Work is underway on a range of regulations and frameworks, which includes inter alia:

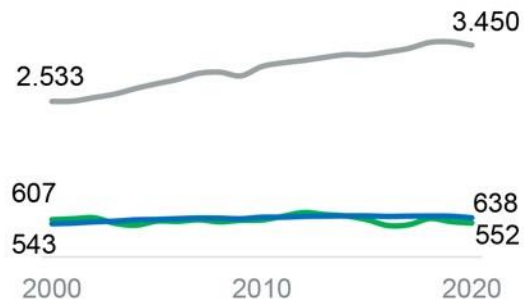
- Review of the three key enabling legislation documents in the Energy sector, (project underway)
- Wheeling framework (near completion),
- SSEG regulations (near completion),
- Reviewal of Tariff Methodology (new support request),
- Reviewal of Grid Codes (near completion),
- and Mini-grid and Off-grid regulatory framework (issued, to be gazetted).

Eswatini issued an updated 'Long-term Energy Masterplan of 2034' to a 2050 version (draft). This will be formalised in 2024 together with an updated Short-term Generation Expansion Plan.

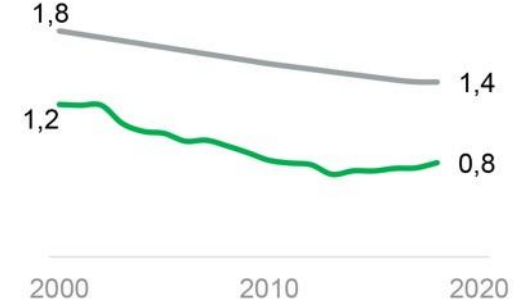
Energy Snapshot

— World
— Africa — Sub-Saharan Africa
— Eswatini

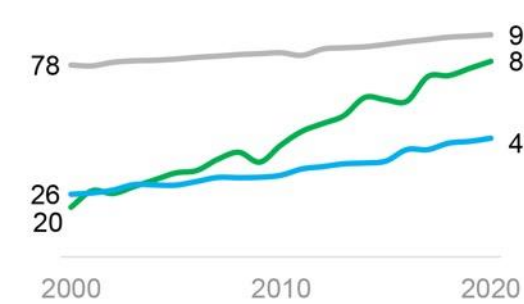
Per capita electricity consumption (kWh/person)



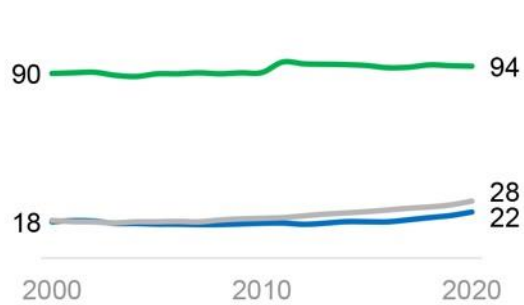
Energy intensity (kWh per 2011\$ PPP)



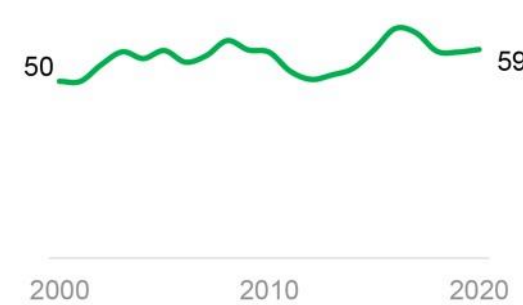
Access to electricity (%)



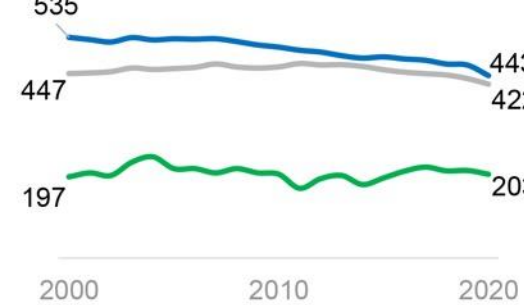
Renewable share of electricity (%)



Net electricity imports (%)



Electricity carbon intensity (grams of CO2eq. per kWh)



Key figures Economy

Population: 1.17 million
GDP per capita (current US\$): 4,214.9
GDP growth: 7.4%

Environmental

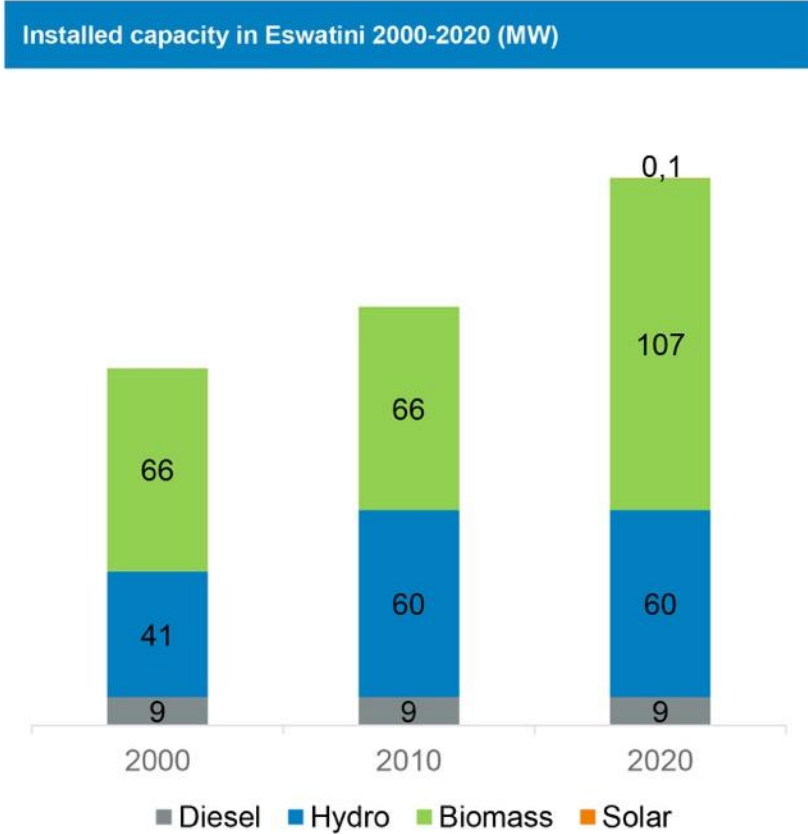
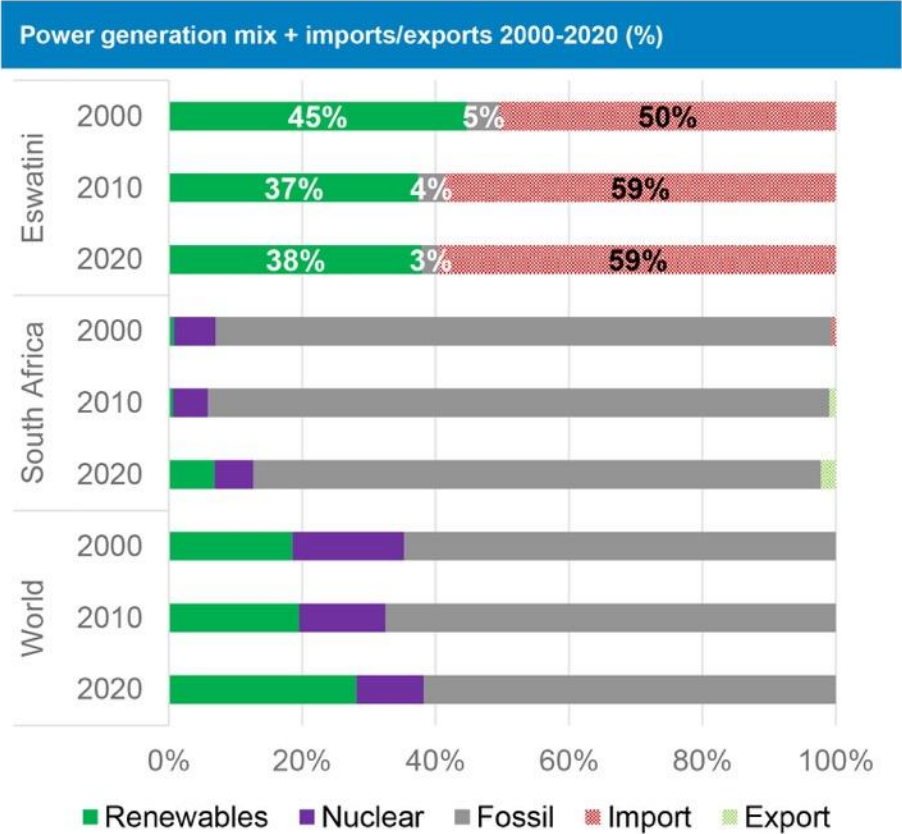
CO2 emissions: 0.8 metric tons per capita
Electricity carbon intensity: 203 grams of CO2eq. per kWh

Energy

Per capita electricity consumption: 552 kWh/person
Access to electricity: 79.7%

Source: OurWorldInData.org and data.worldbank.org

Generation Mix & Installed Capacity



Key statistics for Eswatini (2021/22)

Electricity demand: 233 MW
 Energy sales: 1 225 GWh
 Local generation: 302,9 GWh
 Imported energy: 913,4 GWh

Installed capacity:

EEC (Eswatini Electricity Company)

- Hydro: 60.4 MW
- Diesel: 9 MW (mothballed)
- Solar PV: 10 MW (comm 2021)
- BESS: 1 MWh (testing)

USL (Ubombo Sugar Limited)

- Thermal Biomass: 40.5 MW
- Hydro: 1 MW

RES (Royal Eswatini Sugar)

- Thermal Biomass: 65.5 MW

USA Distillers

- Coal: 2.2 MW




Wundersight

- Solar PV: 100 kW

Source: own elaboration based on OurWorldInData.org

Source: own elaboration based on Eswatini's Short-term Generation Expansion Plan (2018) and Energy Master Plan 2034 (2018)

Key Stakeholders in Current Power Supply Market

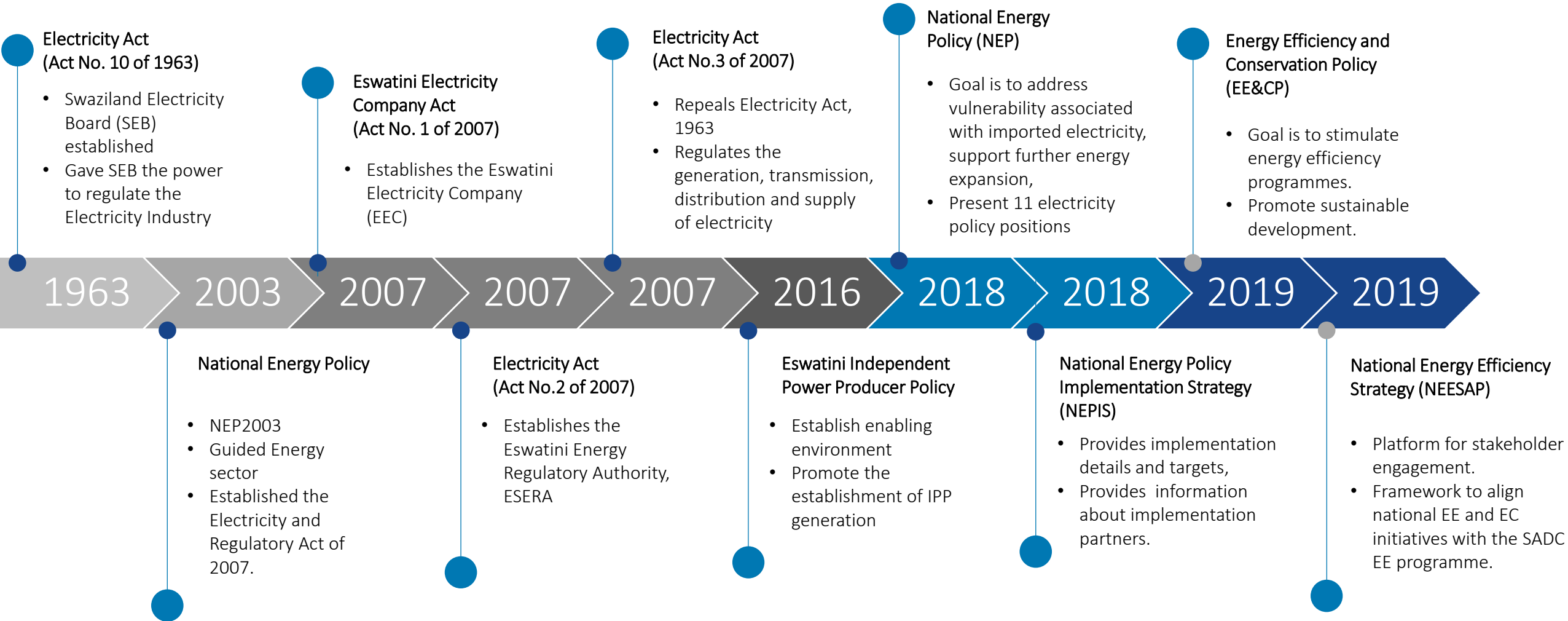
Institution	Description
Ministry of Natural Resources and Energy (MNRE)	 <p>The Energy Department of the Ministry of Natural Resources and Energy (MNRE) is the custodian of policy and activities pertaining to the energy sector. Its mission is to effectively manage the national energy resources and to work towards affordable and sustainable energy provision for all people in the country, while ensuring the international competitiveness of the energy sector.</p>
Eswatini Energy Regulatory Authority (ESERA)	 <p>The Eswatini Energy Regulatory Authority (ESERA), is a statutory body established through the Energy Regulatory Act, 2007. The Authority is mandated to administer the Electricity Act, 2007 (Act No. 3 of 2007), with the primary and core responsibilities of exercising control over the electricity supply industry (ESI) and ensuring the security of supply of electricity through the issuance of licenses and the regulation of electricity tariffs and quality of supply and services.</p>
Eswatini Electricity Company (ECC)	 <p>Eswatini's electricity is mainly supplied by the Eswatini Electricity Company (ECC), who is engaged in the business of generation, transmission and distribution of electricity. ECC is governed by the following legislations:</p> <ul style="list-style-type: none"> (i) Eswatini Electricity Company Act, 2007. (ii) the Electricity Act, 2007, (iii) the Companies Act, (2009), (iv) the Eswatini Energy Regulatory Act, 2007, (v) the Public Enterprises Unit Act, 1989, and the (vi) the Procurement Act, 2011. ECC is the successor to the Swaziland Electricity Board (SEB) which was established in terms of the Electricity Act, 1963 (Act No. 10 of 1963). ECC is subject to regulation by ESERA.

Key Stakeholders in Current Power Supply Market

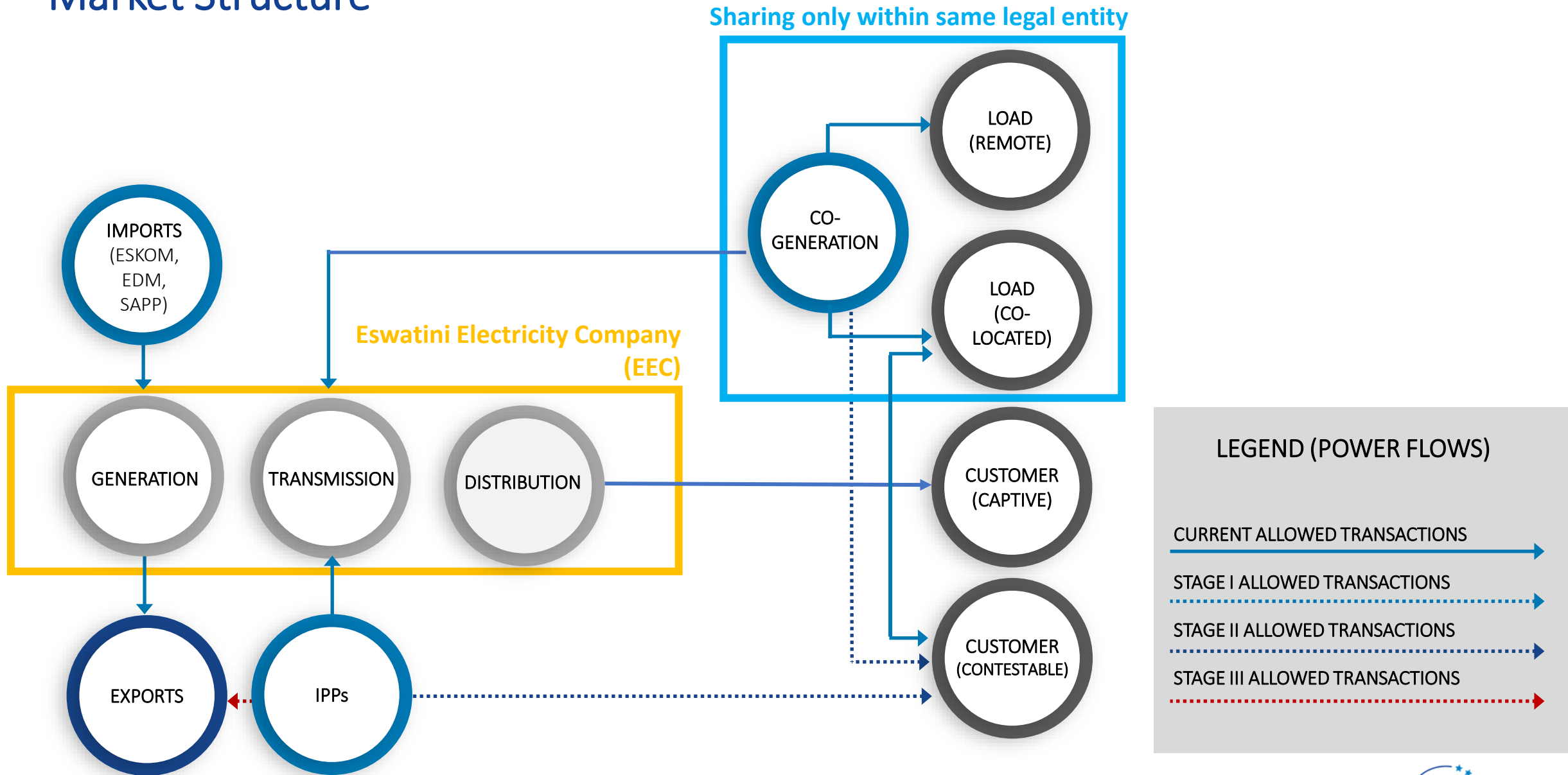
Institution		Description
Private Sector Self-Generators and/or IPP's		<p>Key private sector players include co-generators in the sugar industry at Umbombo Sugar Limited (USL) and the Royal Eswatini Sugar Corporation (RES) which use bagasse and wood chips as fuel. USL has an installed capacity of 41.5 MW which is utilized for self-consumption and export to EEC. RES's 65.5 MW generation is currently limited to self-consumption.</p>
Import Partners		<p>Eskom is a South African electricity utility that is a member of SAPP and has entered into a long-term agreement with EEC for the supply of electricity. EEC imports bulk of its electricity from Eskom. The current import agreement lapsed in 2025, and re-negotiation of the agreement is taking place. EDM is a Mozambican electricity utility that is a member of SAPP and currently supply Eswatini with up to 20 MW of power on an agreed 17-month power purchase agreement. Eswatini also buys electricity from the SAPP Day Ahead market from time to time.</p>

Source: own elaboration based on esera.org.sz and gov.sz

Regulation and Energy Policy Instruments



Market Structure



GET.transform Advisory Services



LONG TERM
ENERGY PLANNING



RENEWABLE ENERGY
GRID INTEGRATION



ON-GRID REGULATION &
MARKET DEVELOPMENT



OFF-GRID REGULATION &
MARKET DEVELOPMENT

Overarching
Activities

Capacity Building

Technical Assistance

Key Topics

Planning Governance

Grid Codes

Power Sector Strategy

Integrated Electrification
Planning

Scenarios and Modelling

Transmission System
Planning and Operation

Governance

Mini-Grid Framework

Adoption and Implementation

Distribution System
Planning and Operation

Market Mechanisms

Public Mini-Grid Incentives

State of Play



LONG TERM ENERGY PLANNING



RENEWABLE ENERGY GRID INTEGRATION



ON-GRID REGULATION & MARKET DEVELOPMENT



OFF-GRID REGULATION & MARKET DEVELOPMENT

Energy Masterplan 2034, 2018 (MRNE)

The International Atomic Energy Agency (IAEA), in conjunction with IRENA and MNRE, EEC, ESERA, CSO and UNISWA, is updating the masterplan up to year 2050. The draft of the updated Energy Masterplan 2050 is published and will seek Cabinet approval in Q1 of 2024.

Short-term Generation Expansion Plan (SGEP), 2018 (MNRE)

Under the Eswatini Country Window an activity is underway to update the SGEP. The new plan will be published in Q1 of 2024 and will seek Cabinet approval in the same period.

IPP auctions

To date two IPP auctions were concluded:

- A 40MW Solar PV auction around 2020 is still not awarded due to legal proceedings. A negotiated settlement to this is expected in HY1 of 2024.
- A 40MW Biomass auction closed in November 2023 and is currently under adjudication.

ESERA are planning further biomass and wind auctions.

Priority support projects identified by Public Sector Actors in June 2022:

- Short-term Generation Expansion Plan aligned to Energy Masterplan (2050)
- Assessment of biomass for purposes of maximising local power generation
- Assistance with a Feasibility study for the Ngwempisi Multipurpose Hydro Scheme
- Assistance with Feasibility studies on wind energy resource assessment in Eswatini

Priority support projects identified by Public Sector Actors in December 2023:

- Energy Access Survey for Eswatini Cities and Towns.
- Capacity building on Energy Efficiency.
- The promotion of clean cooking energy for Institutional Stoves in Education Institutions in Eswatini.

CHALLENGES AND OPPORTUNITIES

- ...

State of Play



LONG TERM ENERGY PLANNING



RENEWABLE ENERGY GRID INTEGRATION

Grid Codes

The Eswatini grid codes were developed in 2014/2015. Part of these codes was the release of the “Grid Connection Code for Renewable Power Plants (RPPs) connected to the electricity Transmission System (TS) or the Distribution System (DS)”. The updated grid code for RPPs is expected to be updated by December 2022. Under the Eswatini Country Window an assignment is underway to update the other Grid Codes and integrate them with each other. This will be concluded in Q1 of 2024.

EG / SSEG codes and procedures

Considering the activity in the EG (SSEG) space within the Eswatini electricity industry, no formal standards or codes exist to regulate integration of SSEG. Under the Eswatini Country Window an assignment is underway to inter alia achieve the following: rules and guidelines for EG applications, a streamlined application processes, capacity building in RE installation testing, an updated MV network model and capacity building on RE application assessment. Further support on SSEG capacity building is also under implementation through the GET.transform Policy Catalyst.



ON-GRID REGULATION & MARKET DEVELOPMENT



OFF-GRID REGULATION & MARKET DEVELOPMENT

Priority support projects identified by Public Sector Actors (June 2022):

- Develop a standard for grid integration for Embedded Generation (EG) above 1MW
- Develop regulatory framework for Energy Storage Systems
- Capacity Building on Renewable Energy Integration
- Defining the ancillary services market for Eswatini
- Review of Grid Codes
- Capacitation on combined demand/load forecasting with generation

Priority support projects identified by Public Sector Actors (December 2023):

- Operationalisation of the Grid Code.

CHALLENGES AND OPPORTUNITIES

- ...

State of Play



LONG TERM ENERGY PLANNING



RENEWABLE ENERGY GRID INTEGRATION



ON-GRID REGULATION & MARKET DEVELOPMENT



OFF-GRID REGULATION & MARKET DEVELOPMENT

National Energy Policy, 2018 (MNRE)

The MNRE published a National Energy Policy (NEP) and National Energy Policy Implementation Strategy (NEPIS) in 2018. The NEP replaced the NEP 2003 which has driven energy sector development up to 2018. The NEP (2018) provides 11 electricity policy positions.

Independent Power Producer (IPP) Policy

The Independent Power Producer Policy document was prepared by the USAID Southern Africa Trade Hub in close collaboration with the Department of Energy under the Ministry of Natural Resources and Energy.

The goal of the IPP Policy is "ensuring that the development goals of the country as set out in the Vision of the National Development Strategy are met, through the establishment of an enabling environment to promote the establishment of sustainable renewable energy and IPP generation sources for the benefit of all the citizens of the country". The IPP Policy present 28 policy positions.

Priority support projects identified by Public Sector Actors (June 2022):

- Structuring of bidding process for procuring wind and small hydro Power from IPP's
- Develop Guidelines for market reform to accommodate Contestable Customers
- Develop a Business case for small hydro in Eswatini
- Support the Small-Scale Embedded Generation (SSEG) working group (Various items)

Priority support projects identified by Public Sector Actors (June 2023):

- Review and update of the energy sector enabling legislation.

Priority support projects identified by Public Sector Actors (December 2023)

- Development of Contestable Customer Guideline.
- Electric Vehicle Framework.
- Embedded generation Feed-In Tariff (already passed on the SEA for PolCat window).
- Electricity multi-year price determination Tariff Methodology for the regulation and approval of Tariffs, Prices, and Charges in the Eswatini Electricity Supply Industry.
- Transactional Advisory Support for third Tranche 80MW Biomass Procurement.
- Transactional Advisory Support for Wind Power Procurement.

CHALLENGES AND OPPORTUNITIES

- ...

State of Play



LONG TERM ENERGY PLANNING



RENEWABLE ENERGY GRID INTEGRATION



ON-GRID REGULATION & MARKET DEVELOPMENT



OFF-GRID REGULATION & MARKET DEVELOPMENT

ESERA published 'Mini-Grid and Micro-Grid Guidelines' in March 2022. These Guidelines shall come into force on the date of publication in the gazette.

MNRE commissioned the World Bank for a Least-Cost Electrification Study of which the draft report was published in October 2022. An assessment into the potential for mini-grids and off-grids in Eswatini forms part of this study.

The UNDP presented a Programme Framework for Affordable Renewable Energy in Swaziland (PARES). One of the strategic objectives of this program was focused on “Promoting off-grid solutions and formulation of pro poor Investment Support Program for Decentralized Renewable Energy (DRE)”.

EEC implemented in August 2020 the Sigcineni Off-Grid Solution Project as a stand-alone mini-grid which consists of a centralised 35kW solar PV generation plant complete with 200kWh battery storage system and an AC LV reticulation network designed to service about 26 rural homesteads through an advanced smart metering system for billing. The customers are charged for electricity usage through the standard domestic tariff.

Priority support projects identified by Public Sector Actors: (June 2022)

- Capacity Building on off-grid Renewable Energy market

Priority support projects identified by Public Sector Actors (December 2023)

- None.

CHALLENGES AND OPPORTUNITIES

- As stated in the UNDP report policy, legal, and regulatory frameworks for off-grid RE energy programmes are inadequate and require further development.
- No procurement framework exists for mini-grid or off-grid systems.

Priority Projects currently Supported by GET.transform



LONG TERM ENERGY PLANNING

Develop a Short-term Generation Expansion Plan aligned to Energy Masterplan (2050)



RENEWABLE ENERGY GRID INTEGRATION

Review of Grid Codes

Support to the SSEG workgroup, with a focus on:

- Recommendation on best options to achieve application process efficiencies and oversight on the implementation thereof.
- Improved competency and confidence to promote high quality installations.
- Updated EG framework.
- An integrated MV network with geospatial viewing on PowerFactory.
- A balanced network that effectively utilises available internal generation from EG/SSEG.



ON-GRID REGULATION & MARKET DEVELOPMENT

Review and update of the three key energy sector enabling legislation documents.



OFF-GRID REGULATION & MARKET DEVELOPMENT

Priority Projects requested in December 2023 for support from GET.transform



LONG TERM ENERGY PLANNING

- Energy Access Survey for Eswatini Cities and Towns.
- Capacity building on Energy Efficiency.
- The promotion of clean cooking energy for Institutional Stoves in Education Institutions in Eswatini.



RENEWABLE ENERGY GRID INTEGRATION

- Operationalisation of the Grid Code.



ON-GRID REGULATION & MARKET DEVELOPMENT

- Development of Contestable Customer Guideline.
- Electric Vehicle Framework.
- Electricity multi-year price determination Tariff Methodology for the regulation and approval of Tariffs, Prices, and Charges in the Eswatini Electricity Supply Industry.
- Transactional Advisory Support for third Tranche 80MW Biomass Procurement.
- Transactional Advisory Support for Wind Power Procurement.
- Embedded generation Feed-In Tariff (*already passed on the SEA for PolCat window*).



OFF-GRID REGULATION & MARKET DEVELOPMENT

NOTE

The table above includes all the requests for project support received from the public sector partners in December 2023. The **green** highlighted items are the priority projects that GET.transform are keen to support.

Priority Projects to Be Supported by GET.transform*

July 2023 version



LONG TERM ENERGY PLANNING

Develop a Short-term Generation Expansion Plan aligned to Energy Masterplan (2050)

- Assessment of biomass for purposes of maximizing local power generation
- Assistance with a Feasibility study for the Ngwempisi Multipurpose Hydro Scheme
- Assistance with Feasibility studies on wind energy resource assessment in Eswatini



RENEWABLE ENERGY GRID INTEGRATION

- Review of Grid Codes
- Defining the ancillary services market for Eswatini
- Capacity Building on Renewable Energy Integration
- Capacitation on combined demand/load forecasting with generation
- Capacitation on Short-term planning for renewables and Embedded Generation
- Capacitation of Network Operators and the Trading Desk on renewables and Embedded Generation



ON-GRID REGULATION & MARKET DEVELOPMENT

- Structuring of bidding process for procuring wind and small hydro Power from IPP's
- Develop Guidelines for market reform to accommodate Contestable Customers
- Develop a standard for grid integration for Embedded Generation (EG) above 1MW
- Support the Small-Scale Embedded Generation (SSEG) working group (Various items)
- Support with SSEG training and setting up PV Green card Accreditation in Eswatini
- Develop regulatory framework for Energy Storage Systems
- Develop a Business case for small hydro in Eswatini
- Capacitation of ESERA and MNRE on market reform and regulation



OFF-GRID REGULATION & MARKET DEVELOPMENT

Development of an Off-grid Renewable Energy market

*NOTE

The table above includes all the requests for project support received from the public sector partners. The green (current) and orange (completed) highlighted items are the priority projects supported by GET.transform



Status of Technical Assistance

Lesotho ESTO Table



LONG TERM ENERGY PLANNING

- Technically support the DoE in the Least Cost Power Development Plan financed by the World Bank and engage with additional capacity building
- Elaborate different concept notes for the pipeline projects from DoE to unlock further funding from the EIB
- Preparation for a grant agreement with ERC/NUL to engage them on different LTEP topics and capacity building
- Support the DoE in creating a Short-term Generation Expansion Plan with different power supply scenarios in an open-source model such as PyPSA.



RENEWABLE ENERGY GRID INTEGRATION

- Review of the Grid Codes for Transmission and Distribution
- Create and implement a methodology to elaborate and calculate the capacity of variable renewable energy integration in the transmission grid
- Support the LEC with an electricity load forecasting system and solar and wind power generation forecasting system
- Create a technical guidance document for grid compliance and grid impact studies



ON-GRID REGULATION & MARKET DEVELOPMENT

- Develop a SAPP Trading Mandate with LEC to set up an Energy Trading Office within
- Support LEWA with the Multi-Year Tariff Application and provide capacity building in assessing tariff applications
- Support DOE/LEC/LEWA with guidelines and standards on how to set up distributed electricity or small-scale embedded generation
- Support LEGCO with an owner's engineer and transaction advisor for the construction of their 2phase – 50MW PV power
- Review the current IPP frameworks and capacitate DOE/LEC/LEW into auction mechanisms and procedures.



OFF-GRID REGULATION & MARKET DEVELOPMENT

- Geospatial electricity access mapping in GIS, with training and capacity building
- Off-grid rural electrification training in technical design, business models and procurement
- Off-grid regulations and policy review
- Support the development of a financial modelling tool for financial planning and tariff setting of mini-grids

Activities supported by GET.transform:

Ongoing
Planned
Completed
Not Covered



3

COUNTRY WINDOW SETUP



Alignment with Other Development Partners

GET.TRANSFORM	WORLD BANK	UNDP	USAID	AFDB
<p>Energy Sector Reform</p>	<p>Electrification Planning Energy Access Survey Transmission Project Studies</p>	<p>Mini-Grids Small Fund Community Grant System</p>	<p>Empower Southern Africa (ESA) Programme</p>	<p>Project (Development) Funding</p>
<p>Long-Term Energy Planning</p> <ul style="list-style-type: none"> Update of the Short-term Generation Expansion Plan (SGEP). <p>Renewable Energy Grid Integration</p> <ul style="list-style-type: none"> Support to the Small-Scale Embedded Generation (SSEG) workgroup. <p>On-Grid Regulation and Market Development</p> <ul style="list-style-type: none"> Review and update of the Eswatini Grid Codes Review and update of the Energy sector enabling legislation. 	<p>Sharing overview of technical assistance projects with each other on an annual basis to avoid duplication in effort</p>	<p>Sharing overview of technical assistance projects with each other on an annual basis to avoid duplication in effort</p>	<p>New USAID programme started in January 2024. Formal interaction to be established.</p>	<p>Provide information on possible projects of the utility that may need financing</p> <p>AfDB conducted an Energy system assessment for the Ministry of Finance</p>
TECHNICAL ASSISTANCE			GRANTS / LOANS	

Country Window Setup

Country

- The Eswatini Country Window is implemented from the Energy Cluster of the South Africa, Lesotho and Eswatini Country Office in Hatfield, Pretoria.
- 1 x Country Coordinator works from the Energy Cluster in the above-mentioned office.
- 1 x Country Coordinator integrates both the GET.transform and GET.invest instruments.
- The Country Window is extended up to September 2024.
- Additional global funding is allocated for additional GET.transform support activities.

GET.transform HQ

- 1 x Africa Partnerships coordinator for overarching CW strategy support.
- 1 x Advisory Services Focal Point for LTEP and RE-Integration.
- 1 x Advisory Services Focal Point for Policy and Regulation.

Technical Assistance Partners

- Expert Consulting Pool for LTEP and RE-Integration.
- Expert Consulting Pool for Policy and Regulation.

Thank you for your attention



Ferdinand Nell
Country Coordinator GET.transform Eswatini
ferdinand.nell@get-transform.eu
+27 82 453 3201

Our Website:

www.get-transform.eu

Follow us:



@GET_transform



@GET-transform