

Eswatini Country Window

Energy System Transformation Overview (ESTO) – March 2023

GET.transform is supported by



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About GET.transform

About GET.transform

European technical assistance programme supporting **national and regional public partners in Africa and Latin America**

- To advance their power sector transformations; and
- To contribute to knowledge sharing and mainstreaming of country and regional experiences.



Long-Term Energy Planning



On-Grid Regulation and Market Development



Off-Grid Regulation and Market Development



Renewable Energy Grid Integration

Regulatory and technical ecosystem for power system transformation

Access to sustainable electricity



Our approach to Technical Assistance

Long-term Energy Planning



Developing least-cost, low carbon **capacity expansion and investment plans**, outlining development paths for power generation projects

On-Grid Regulation and 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 and Market Development



Developing **electrification pathways** building on socio-economic development and productive-use policies

Design and management of **award mechanisms** for procuring off-grid energy

Renewable Energy Grid Integration

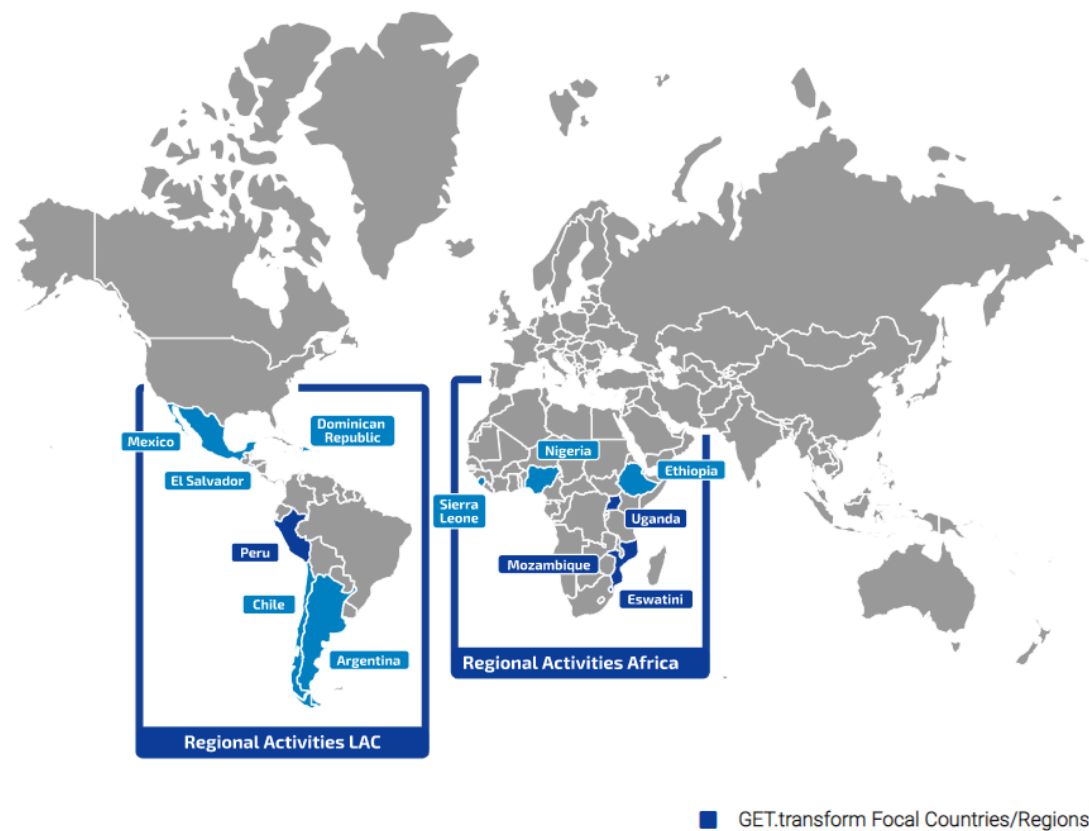


Updating of **technical power system planning and operational procedures** that enable the operation of renewable energy dominated power systems

Increased quantity and quality of policies, regulations and processes enabling large-scale investment into renewable energy

Visit our global *Activity Navigator*

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Topics



Long-Term Energy Planning



On-Grid Regulation & Market Development



Off-Grid Regulation & Market Development



Renewable Energy Grid Integration

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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 review phase focused on a **desk-top review** of a multitude of publicly available energy and power sector publications.

The interview phase focused on further discussions with the key public sector actors (MNRE, ESERA and EEC) to identify potential needs, opportunities and gaps, and culminated in the **public sector actors formally expressing their key priority needs**.

The identify phase focused on **defining potential technical assistance and capacity building projects** that will strongly support the power transition in Eswatini, and that GET.transform is well positioned to support. It also provides a starting point for further engagement with the public sector and other donor agencies.

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

We welcome feedback to enrich our understanding of the power sector and to align support activities with other donor and development agencies.

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. Issues such as the changing global trends towards liberalised energy markets; security of supply; achieving efficiencies; affordability; and access to electricity, amongst others, have introduced a change in the policy trajectory with regards to how Eswatini as a nation views electricity supply. Overall, the electricity supply industry in Eswatini can be broadly defined as an industry in transition, informed both by policy imperatives and regulatory reform.

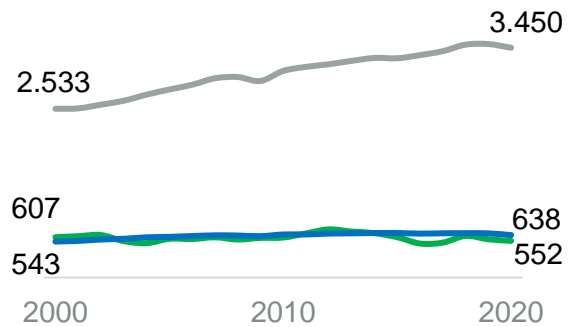
Key policy instruments includes the 'Independent Power Producer Policy' of 2016 and the 'National Energy Policy' of 2018, while work is underway on a range of regulations and frameworks, which includes inter alia: Wheeling framework (near completion), SSEG regulations (under development), Ring Fencing guidelines, Reviewal of Tariff Methodology, Reviewal of Grid Codes (partially underway), and Mini-grid and Off-grid regulatory framework (issued, to be gazetted).

Eswatini is in the process of updating their Long-term Energy Masterplan of 2034 to a 2050 version (expected completion in 2023). This will inform an updated Short-term Generation Expansion Plan.

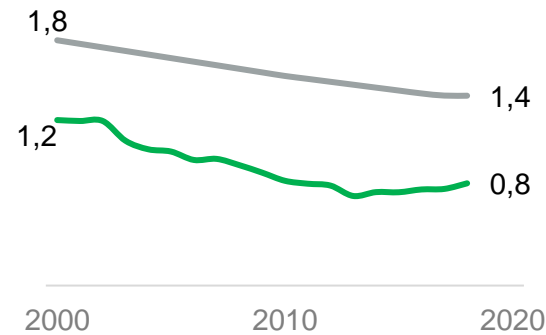
Energy Snapshot

— World
— Africa — Sub-Saharan Africa
— Eswatini

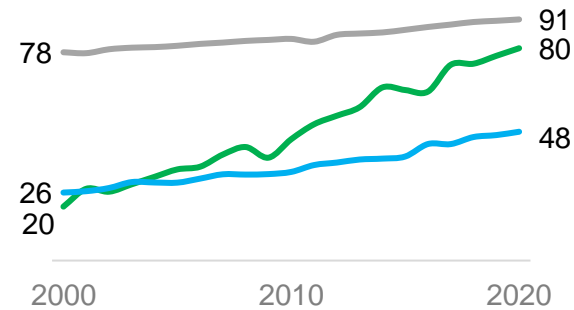
Per capita electricity consumption (kWh/person)



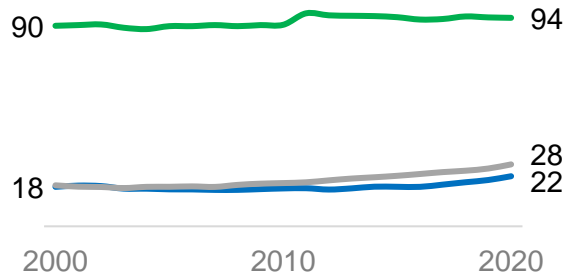
Energy intensity (kWh per 2011\$ PPP)



Access to electricity (%)



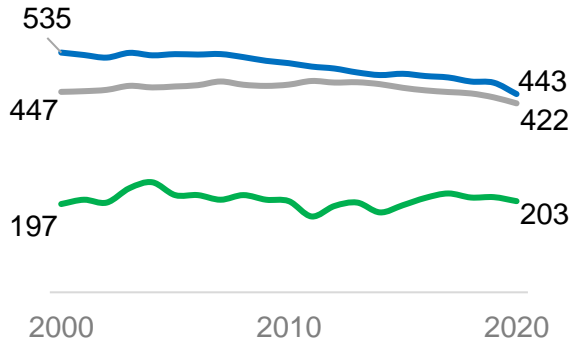
Renewable share of electricity (%)



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

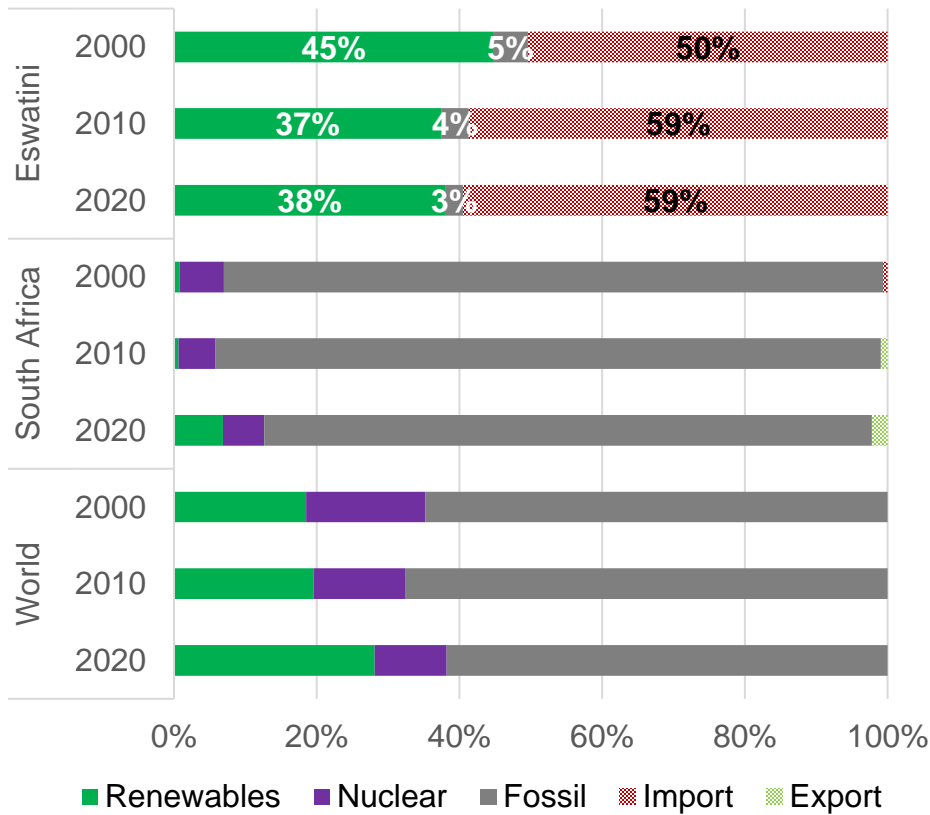
Energy

Per capita electricity consumption: 552 kWh/person

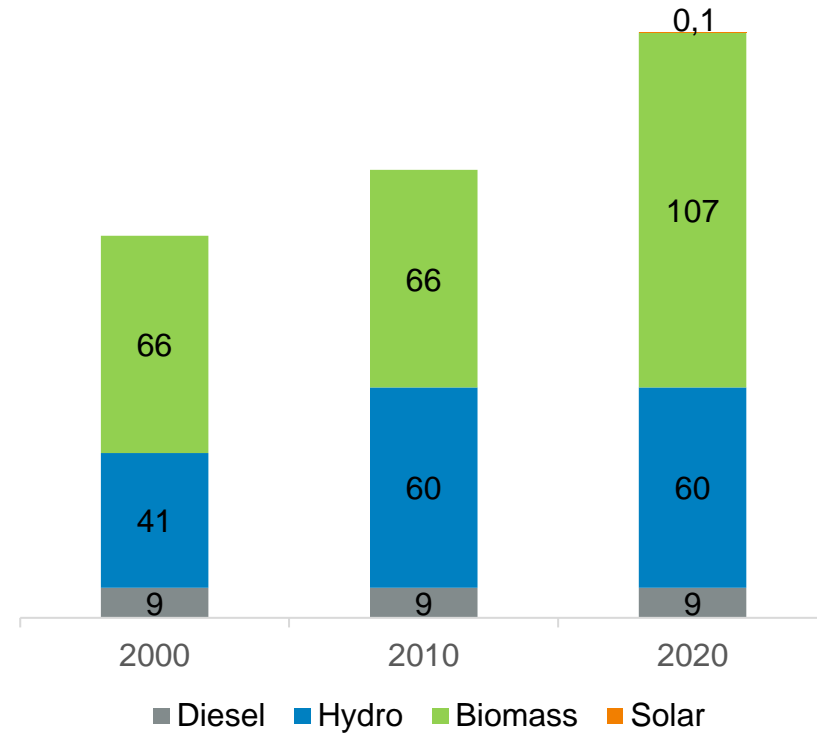
Access to electricity: 79.7%

Generation mix & Installed Capacity

Power generation mix + imports/exports 2000-2020 (%)



Installed capacity in Eswatini 2000-2020 (MW)



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 statistics for Eswatini (2021/22)

Electricity demand: 233MW

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 - 1MWh (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

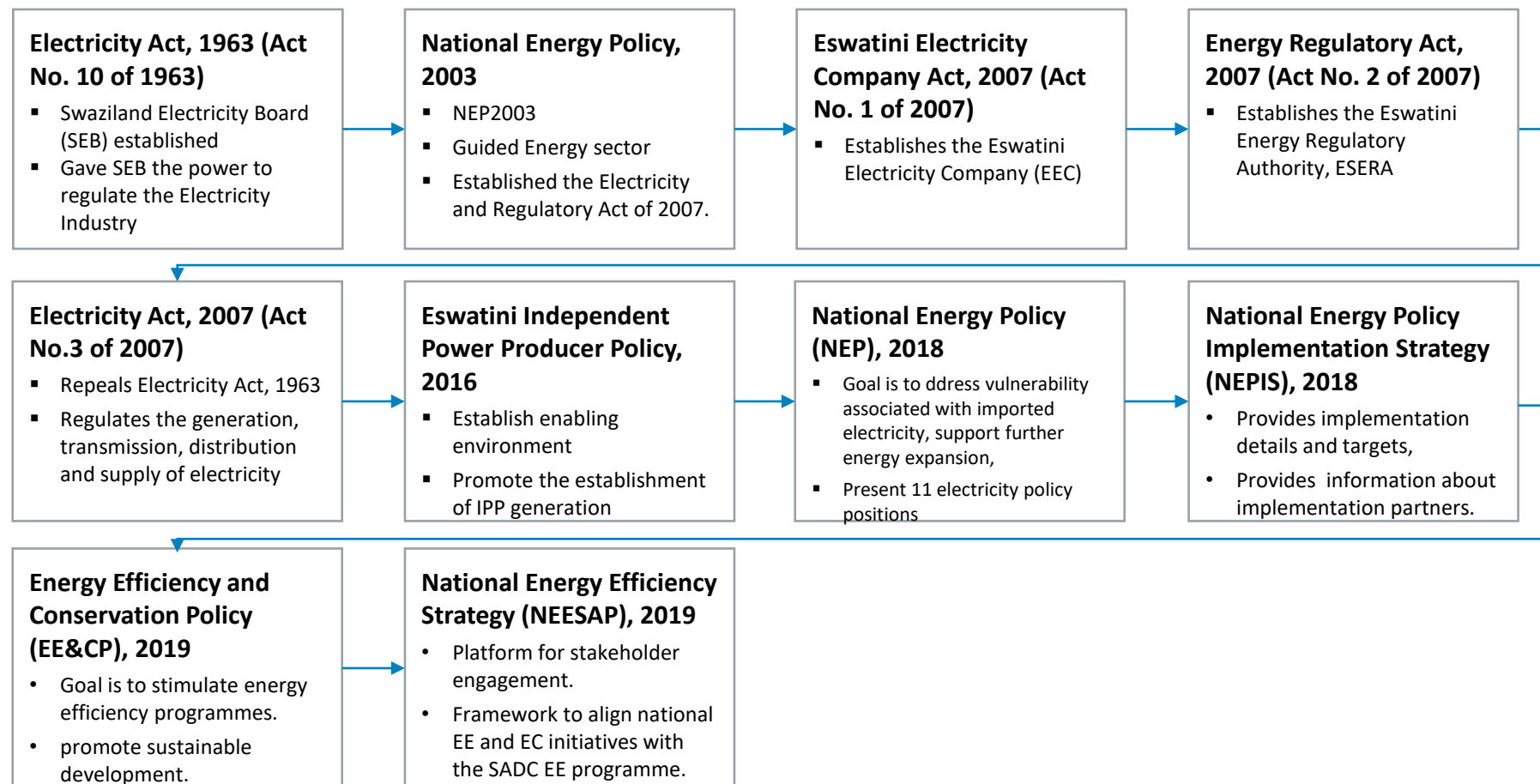
Key stakeholders in current power supply market

Institution	Description
 Ministry of Natural Resources & Energy  	<p>The Energy Department of the Ministry of Natural Resources and Energy (MNRE) is the custodian of policy and operational 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 (EEC)	<p>Eswatini's electricity is mainly supplied by the Eswatini Electricity Company (EEC), who is engaged in the business of generation, transmission and distribution of electricity. EEC is governed by the following legislations: (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.. EEC is the successor to the Swaziland Electricity Board (SEB) which was established in terms of the Electricity Act, 1963 (Act No. 10 of 1963). EEC is subject to regulation by ESERA.</p>
  Private Sector self-generators and/or IPP's	<p>Key private sector players include co-generators in the sugar industry at Ubombo 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-sufficiency 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

Timeline



Source: own elaboration based on esera.org.sz and eec.co.sz

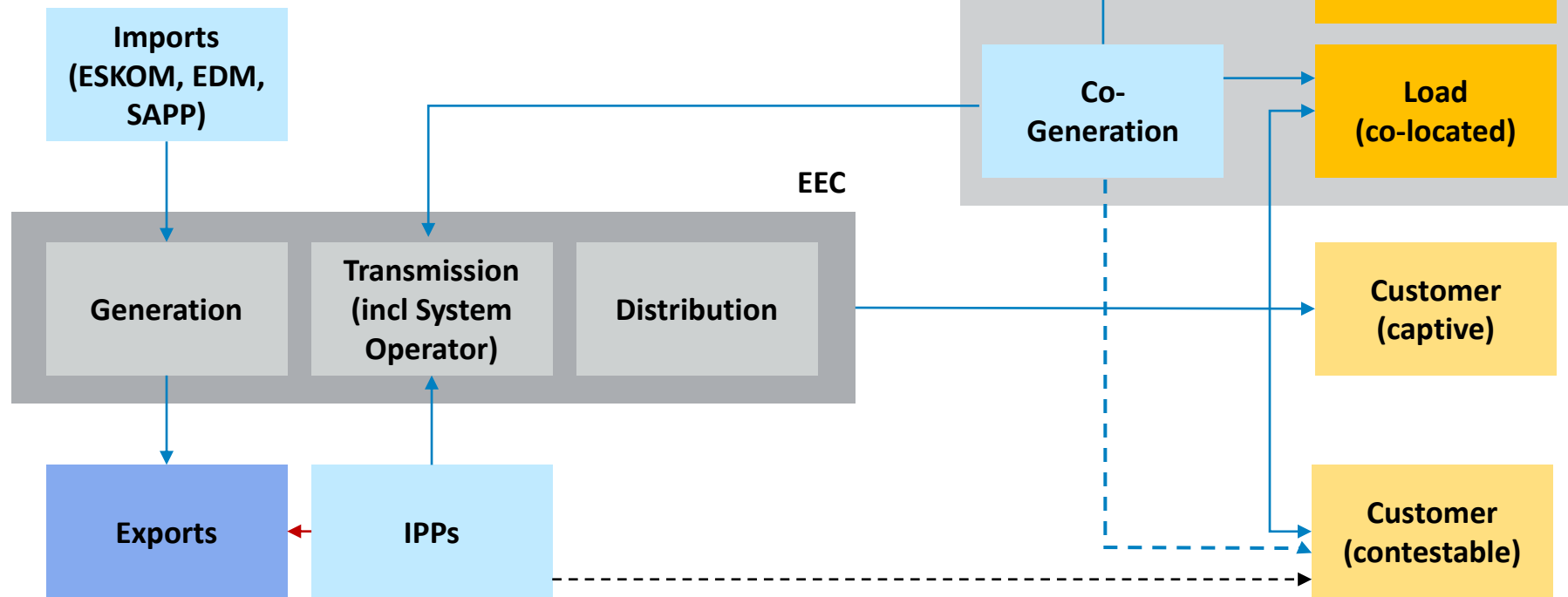
Key takeaways

- The electricity supply industry in Eswatini has undergone changes both from a policy and regulatory point of view. Issues such as the changing global trends towards liberalised energy markets; security of supply; achieving efficiencies; affordability; and access to electricity, amongst others, have introduced a change in the policy trajectory with regards to how Eswatini as a nation views electricity supply.
- Overall, the electricity supply industry in Eswatini can be broadly defined as an industry in transition, informed both by policy imperatives and regulatory reform.
- Change accelerated since 2015 when the Government aligned itself with the Se4All goals.

Market structure

Legend (power flows)

- Current allowed transactions →
- Stage I allowed transactions - - - - - →
- Stage II allowed transactions - - - - - →
- Stage III allowed transactions - - - - - →



Source: Market structure from p31 and 32 of IPP Policy document

Key enabling Policies

National Energy Policy of 2018

- Goal of the policy: “... to ensure the sustainable supply and use of energy for the benefit of all citizens of Eswatini.”

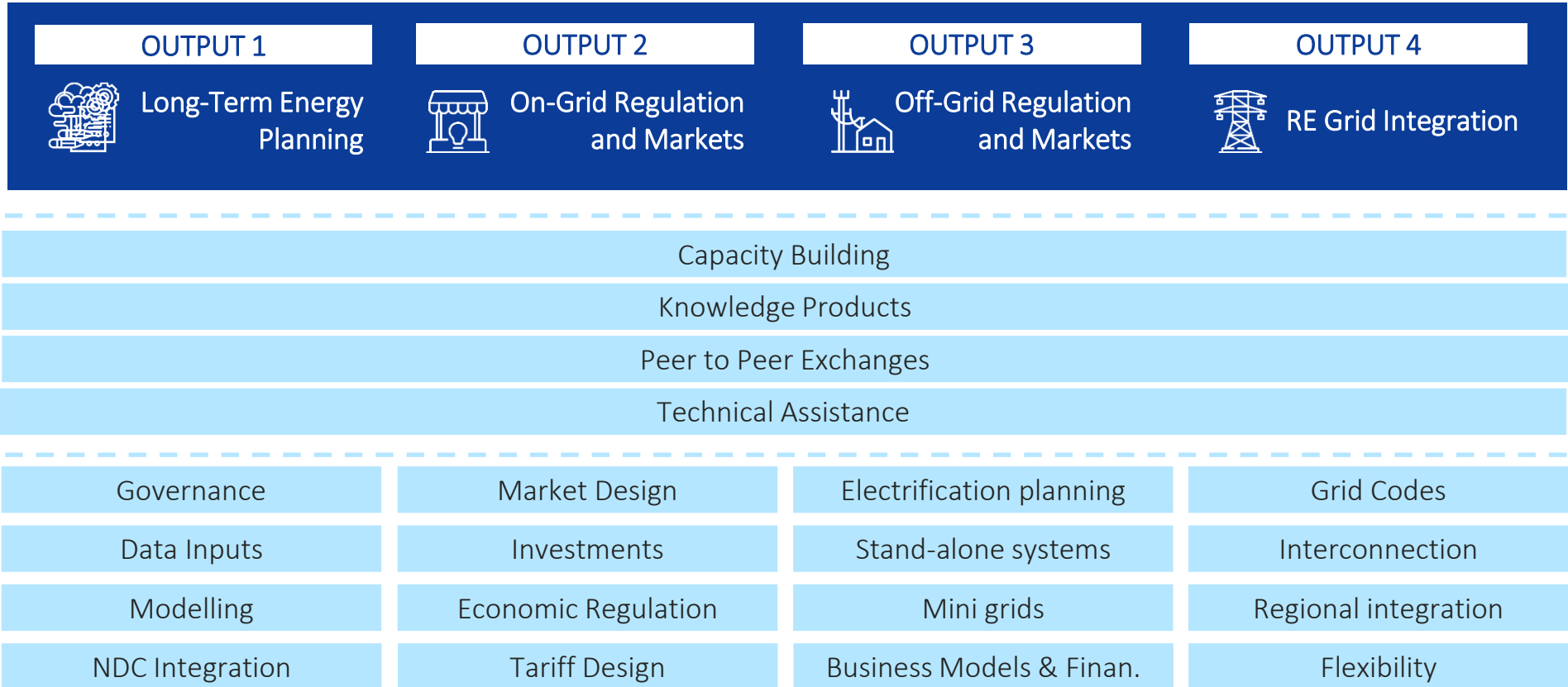
Independent Power Producer Policy of 2016

- Goal of the Policy “...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.”

Regulatory Framework

- Wheeling (near completion)
- SSEG (under development)
- Ring Fencing guidelines
- Reviewal of Tariff Methodology
- Reviewal of Grid Codes (partially underway)
- Mini-grid and Off-grid regulatory framework (issued, to be gazetted)

GET.transform framework



State of play

Long-term Energy Planning	On-grid Markets & Regulation	Off-grid Markets & Regulation	RE Grid Integration	Challenges & Opportunities
<p>Energy Masterplan 2034, 2018 (MRNE)</p> <p>The long-term energy planning of Eswatini is the responsibility of the Department of Energy, within the MNRE. The Energy Masterplan 2034 was released in 2018 and was developed in conjunction with IRENA and provides an analysis of all the available energy resources and investment requirements to meet the forecasted energy demand at minimum cost to the country. This long-term energy plan should be reviewed every 3 to 5 years, and currently 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 updated Energy Masterplan 2050 is expected to be published soon.</p> <p>Short-term Generation Expansion Plan, 2018 (MNRE)</p> <p>The MNRE commissioned Energy Systems Planning (Pty)Ltd (ESP) in 2017 in conjunction with African Legal Support Facility (ALSF) to prepare a Short-term Generation Expansion Plan for Eswatini (SGEP). This plan was published in March 2018. With the issue of the new Energy Masterplan 2050 it is good practice to now also review and update the SGEP.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> Short-term Generation Expansion Plan aligned to Energy Masterplan (2050) <input type="checkbox"/> Assessment of biomass for purposes of maximizing local power generation <input type="checkbox"/> Assistance with a Feasibility study for the Ngwempisi Multipurpose Hydro Scheme <input type="checkbox"/> Assistance with Feasibility studies on wind energy resource assessment in Eswatini 		<ul style="list-style-type: none"> • Limited funding for assessment of viable alternative sources of electricity such as wind, biomass and hydro.

State of play

Long-term Energy Planning	On-grid Markets & Regulation	Off-grid Markets & Regulation	RE Grid Integration	Challenges & Opportunities
<p>National Energy Policy, 2018 (MNRE)</p> <p>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.</p> <p>Independent Power Producer (IPP) Policy</p> <p>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.</p> <p>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.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> Structuring of bidding process for procuring wind and small hydro Power from IPP's <input type="checkbox"/> Develop Guidelines for market reform to accommodate Contestable Customers <input type="checkbox"/> Develop a Business case for small hydro in Eswatini <input type="checkbox"/> Support the Small-Scale Embedded Generation (SSEG) working group (Various items) 		<ul style="list-style-type: none"> • The uptake of EG and SSEG at private level is progressing at a steady rate with little or no regulation, standards or guidelines to assist the authorities to manage these installations. • Both ESERA and EEC has expressed the need for technical assistance and capacity building on setting up an EG/SSEG framework, standards and procedures. • The Grid Codes deployed by Eswatini needs review.

State of play

Long-term Energy Planning	On-grid Markets & Regulation	Off-grid Markets & Regulation	RE Grid Integration	Challenges & Opportunities
<p>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.</p> <p>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.</p> <p>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)”.</p> <p>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.</p>		<ul style="list-style-type: none"> ❑ Capacity Building on off-grid Renewable Energy market 		<ul style="list-style-type: none"> • 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.

State of play

Long-term Energy Planning	On-grid Markets & Regulation	Off-grid Markets & Regulation	RE Grid Integration	Challenges & Opportunities
<p>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)”. This grid code for RE was largely a copy of the South African grid code for renewable power plants. Since the South African grid code for RPPs has undergone several changes since 2014, this has prompted ESERA to appoint an external consultant to update the RPP grid code. The updated grid code for RPPs is expected to be updated by December 2022. The other codes in the Grid Code suite also need revision and updating.</p> <p>Considering the activity in the EG (SSEG) space within the Eswatini electricity industry, no formal standards or codes exist to regulate integration of SSEG. EEC staff are presently following and participating in programs within the South African industry, in order to acquire a better understanding of SSEG impacts and regulation required. A need to capacitate the different stakeholders on development of suitable standards and grid codes, to integrate SSEG, has been clearly identified as potential area of assistance by GET.transform.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> Develop a standard for grid integration for Embedded Generation (EG) above 1MW <input type="checkbox"/> Develop regulatory framework for Energy Storage Systems <input type="checkbox"/> Capacity Building on Renewable Energy Integration <input type="checkbox"/> Defining the ancillary services market for Eswatini <input type="checkbox"/> Review of Grid Codes <input type="checkbox"/> Capacitation on combined demand/load forecasting with generation 		<ul style="list-style-type: none"> • The impact of increased RE penetration on the Eswatini network is unknown. • Regulation of EG, in particular SSEG, needs to be implemented. A mandatory approval process is required so that all necessary information about the EG can be captured. • Enable planning methods and tools to take into account EG in network plans.

Technical assistance requests from stakeholders

Ministry of Energy Natural Resources and Energy (MNRE)

- Design of bid for procuring wind and small hydro Power from IPPs
- Assessment of biomass for purposes of maximizing local power generation
- Feasibility study for the Ngwempisi Multipurpose Hydro Scheme

Eswatini Electricity Company (EEC)

- SSEG training and setting up PV Green card Accreditation in Eswatini
- Defining the ancillary services market for Eswatini
- Capacity of Network Operators and the Trading Desk on renewables and Embedded Generation
- Capacitation on combined demand/load forecasting with generation

Eswatini Energy Regulatory Authority (ESERA)

- Guidelines for Contestable Customer
- Support the Small-Scale Embedded Generation (SSEG) working group on:
 - Capacity building (for Regulator and Utility staff) on SSEG implementation modalities
 - Tariff Setting, technical and revenue impact analysis
 - Grid Integration of SSEG systems
 - Approval process, Monitoring and Evaluation of SSEG systems
- Interconnection standards for Embedded Generation (EG) above 1MM
- Capacity Building on Renewable Energy Integration, including grid code compliance assessment
- Framework for Energy Storage
- Review of Grid Code
- Mobilizing off-grid Renewable Energy Investment
- Business case for small hydro in Eswatini
- Feasibility studies on wind energy resource assessment in Eswatini

Priority projects to be supported by GET.transform (See note at bottom of page)

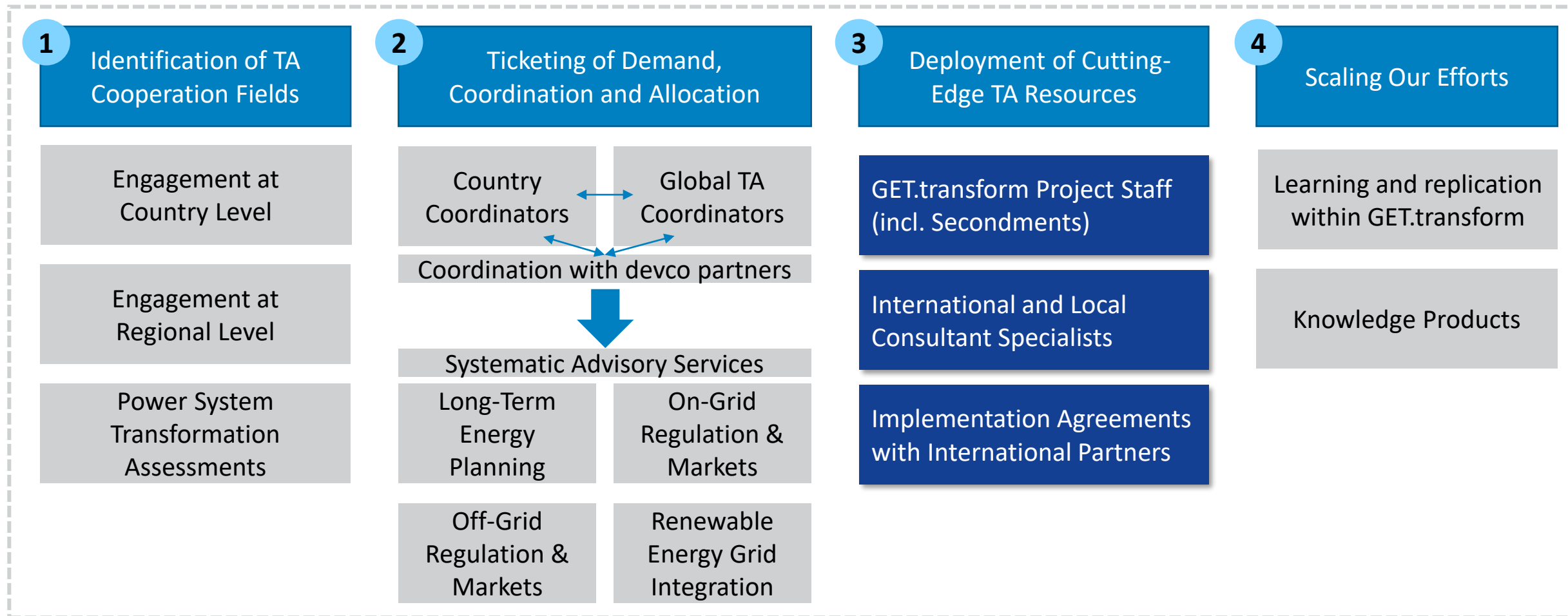
Long-term energy planning	On-grid Markets & Regulation	Off-grid Markets & Regulation	VRE Integration
<p>Develop a Short-term Generation Expansion Plan aligned to Energy Masterplan (2050)</p>	<p>Structuring of bidding process for procuring wind and small hydro Power from IPP's</p>	<p>Development of an Off-grid Renewable Energy market</p>	<p>Review of Grid Codes</p>
<p>Assessment of biomass for purposes of maximizing local power generation</p>	<p>Develop Guidelines for market reform to accommodate Contestable Customers</p>		<p>Defining the ancillary services market for Eswatini</p>
<p>Assistance with a Feasibility study for the Ngwempisi Multipurpose Hydro Scheme</p>	<p>Develop a standard for grid integration for Embedded Generation (EG) above 1MW</p>		<p>Capacity Building on Renewable Energy Integration</p>
<p>Assistance with Feasibility studies on wind energy resource assessment in Eswatini</p>	<p>Support the Small-Scale Embedded Generation (SSEG) working group (Various items)</p>		<p>Capacitation on combined demand/load forecasting with generation</p>
	<p>Support with SSEG training and setting up PV Green card Accreditation in Eswatini</p>		<p>Capacitation on Short-term planning for renewables and Embedded Generation</p>
	<p>Develop regulatory framework for Energy Storage Systems</p>		<p>Capacitation of Network Operators and the Trading Desk on renewables and Embedded Generation</p>
	<p>Develop a Business case for small hydro in Eswatini</p>		
	<p>Capacitation of ESERA and MNRE on market reform and regulation</p>		

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)

3

Next steps

How does GET.transform execute projects?



Operational plans

- Details of the proposed Operational plan for Eswatini is captured on file 'Eswatini GET,transform Draft Operational Plan Jan2023.xls'.