



Kingdom of Swaziland

Sustainable Energy for All

Investment Prospectus

July, 2016

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LIST OF ACRONYMS

AA/IP	Action Agenda and Investment Prospectus
AfDB	African Development Bank
CSO	Central Statistics Office
DSM	Demand-side Management
EE	Energy Efficiency
EU	European Union
FINCORP	Swaziland Development Finance Corporation
FSE&CC	Federation of Swaziland Employers and Chamber of Commerce
GHG	Green-house gases
kW	Kilowatt (10^3 watts)
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
ISO	Independent System Operator/International Standards Organization
LPG	Liquefied Petroleum Gas
MNRE	Ministry of Natural Resources and Energy
MW	Megawatt (10^6 watts)
PPP	Public Private Partnership
PV	Photovoltaic
RSSC	Royal Swaziland Sugar Corporation
RRA	Renewables Readiness Assessment
RE	Renewable Energy
REASWA	Renewable Energy Industry Association of Swaziland
RETs	Renewable Energy Technologies
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SE4ALL	Sustainable Energy for All
SEA	Swaziland Environment Authority
SEC	Swaziland Electricity Company (Formerly SEB)
SEF	Swaziland Environment Fund
SERA	Swaziland Energy Regulatory Authority
SIPA	Swaziland Investment Promotion Authority
SWASA	Swaziland Standards Authority
SWSC	Swaziland Water Services Corporation

EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Background

Swaziland is participating in the Sustainable Energy for All (SE4ALL) Initiative of the UN General Assembly, as one of the 43 participating African countries out of 83 countries globally. The Initiative aims at mobilizing action from the global community, governments, the private sector, and civil society around three objectives: i) ensuring universal access to modern energy services; ii) doubling the global rate of improvements in energy efficiency; and iii) doubling the share of renewable energy in the global energy mix, all to be reached by 2030. In response to the Initiative, Swaziland has developed its SE4ALL Agenda and Investment Prospectus for Swaziland, with the support of the UNDP. This document is the Investment Prospectus of the Kingdom of Swaziland.

1.2 Methodology for developing the Swaziland SE4ALL IP

The methodology used to prepare the Investment Prospectus was based on the principles of ownership and participation of the various stakeholders in Swaziland. Consultations were held with the stakeholders to raise their awareness on the principles and fundamentals of Sustainable Energy for All (SE4ALL) and to identify high priority energy projects as well as build ownership for these energy projects across the country. Through the consultations, the country Action Agenda was developed to implement the high priority energy projects, from which was distilled the Investment Prospectus for the implementation.

2. INVESTMENT THESIS ON SE4ALL IN SWAZILAND

The investment thesis provides the general context to the SE4ALL Investment Prospectus for Swaziland, including the policy, legal and regulatory issues relevant to the thesis. The relevant elements of the thesis include:

- Country overview;
- Energy sector trajectory; and
- Investing in Swaziland
 - Energy Policy and Strategy;
 - Legal and regulatory framework of energy sector;
 - Supporting policies and strategy;
 - Institutional framework of energy stakeholders;
 - Swaziland's attractive financing and investment framework
 - Government commitment towards private sector

2.1 Country overview

Swaziland is bordered by Mozambique and South Africa and occupies a geographical size of 17,360 km². With a young and growing population of approximately 1.27 million people in 2014

and a Gross Domestic Product (GDP) growth rate of 2% in 2014, according to the World Bank, the Kingdom of Swaziland, is considered a middle-income country.

2.2 Energy sector trajectory

Energy supply remains a challenge as Swaziland imports all its petroleum products and about 75% of its electrical energy requirements. Access to clean energy sources in rural areas still remains about 50%. Almost 100% of the electricity supply from internal generation is from hydropower and sugar cane-based cogeneration.

A review of the National Development Strategy by the Ministry of Economic Planning and Development (MEPD) revealed that amongst the Strategy's achievements, the national electrification programme had managed to attain a national rate of access to electricity of 55% (65% urban and 45% rural), as well as electrifying all clinics in the country and more than 90% of rural schools.

Swaziland currently imports of the bulk of its power from South Africa and Mozambique, despite being well-endowed with conventional and renewable energy resources, including coal, solar, hydro, wind and biomass residues from the sugar and forestry industries. These resources are potentially able to meet the entire national energy demand if fully exploited, as well as potentially provide for the export of excess capacity to Swaziland's neighbours. High dependency on power imports contributes significantly to the country's current account deficit and increases the country's exposure to energy supply risks, both in terms of supply security and price shocks. These issues were exacerbated in 2013-15, when there was an energy crisis in South Africa.

2.3 Investing in Swaziland

The attractiveness of investing in sustainable energy projects in Swaziland is governed by the following favourable characteristics of the country:

- Transparent regulatory and enabling instruments - Policy, strategies, legal and regulatory framework;
- Cost-reflective electricity tariffs;
- Fair and transparent licencing system;
- Well-structured and broad-based institutional framework of energy stakeholders; and
- Swaziland's attractive financing and investment framework.

2.3.1 Energy Policy and Strategy

The overarching development Master Plan of Swaziland is the National Development Strategy (NDS) – Vision 2022, which was developed in 1999. Vision 2022 spells out all the key macro-sectoral strategies that need to be in place so that by the year 2022, the Kingdom of Swaziland would be in the top 10 per cent of the medium human development group of countries. All policies in the energy sector are therefore formulated with the aim of contributing to reaching NDS-Vision 2022 objectives. The country's energy policy environment is governed by the

National Energy Policy (NEP), the National Forestry Policy, the National Energy Policy Implementation Strategy (NEPIS) and the National Biofuels Development Strategy.

2.3.2 Legal and regulatory framework of energy sector

The Swaziland legal and regulatory energy framework is made up of the following laws:

- Energy Regulatory Act and Electricity Act of 2007; and
- 2002 Environment Management Act.

2.3.3 Supporting policies and strategy

In addition to the energy policies and strategies, other instruments exist that support the development of the indigenous energy resources of Swaziland. These instruments include:

- Poverty Reduction Strategy and Action Plan;
- Public Private Partnership Policy; and
- Environment Management Act, 2002.

2.3.4 Institutional framework of energy stakeholders

Over the years, Swaziland has developed a well-structured, broad-based and collaborative institutional framework of stakeholders in the energy sector. The energy sector in Swaziland is mainly governed by the state through different ministry and government-owned agencies. In addition, important stakeholders such as industry associations, research and educational institutes, as well as non-governmental organisations and development partners, are very active. This institutional framework has great potential to ensure the effective deployment of energy technologies for the benefit of a broad cross-section of the population of Swaziland.

2.3.5 Swaziland's attractive financing and investment framework

Around US\$50 million has been invested in the energy sector in Swaziland over the past five years. Of this, 79% is attributed to Swaziland Electricity Company (SEC) and 21% to the government and development partners. The bulk of these investments have been geared towards grid intensification and demand side management projects funded and implemented by SEC. The Swaziland Investment Promotion Authority (SIPA) is the one-stop shop for both domestic and foreign investors to source information related to doing business in Swaziland, including the provision of, or recommendation for, investment incentives.

2.3.5.1 Investment incentives in Swaziland

The investment incentives in Swaziland include:

- Duty-free access on capital goods and raw materials;
- Repatriation of profits and legal protection of investments;
- Human resources training rebate; and
- Development approval order.

2.3.5.2 Ease of doing business in Swaziland

Globally, Swaziland stood in 2015 at 105 in the ranking of 189 economies on the ease of doing business (an improvement from 134 in 2012). The country's with "Distance to Frontier" score (that benchmarks economies with respect to regulatory practice) of 59.1, which is higher than the regional average of 49.7 in sub-Saharan Africa. The good ratings of Swaziland in terms of "Ease of Doing Business" hold good prospects to encourage investment in universal access to modern energy services, renewable energy and energy efficiency in Swaziland.

2.3.5.3 Government commitment towards private sector

In the 2015 Budget speech, the Minister of Finance of Swaziland emphasized that electricity costs and supply are the primary concern of many businesses in the country, and the Government will *"continue to explore new generation opportunities, while continuing to increase the number of Swazis with access to electricity"*. He mentioned that the participation of Independent Power Producers (IPPs) has been encouraged by Government.

In His Speech from the Throne in 2015, His Majesty the King also stressed the serious need to invest in local generation of power, as importing power could no longer be guaranteed. He mentioned that *"while the Government is engaged in the process of looking into new energy sources, consideration should be given to additional hydro-generation, renewable energy, as well as thermal power generation, just to mention a few."*

The level of commitment of the Government of Swaziland demonstrated through His Majesty's Government's Programme of Action 2013-2018 offers great potential for investments in the Kingdom on universal energy access, renewable energy and energy efficiency in the Kingdom to address the objectives of Sustainable Energy for All.

3. THE SE4ALL INITIATIVE FOR SWAZILAND

The SE4ALL Rapid Assessment and Gap Analysis identified priority intervention areas to accelerate the attainment most of the goals of SE4ALL before 2030. The priority intervention areas cover where the removal of critical bottlenecks are likely to yield the highest and most widespread impacts on people's living conditions and economic livelihoods, particularly in underserved rural communities and households. The Government of Swaziland is committed to support and promote projects to contribute towards the objectives of the SE4ALL, with the active participation of the private sector, for the benefit of all the citizens of the country. The Government has set some targets towards SE4ALL for its people.

In line with Swaziland's Vision 2022, one of the key objectives of the Ministry of Natural Resources and Energy is *"to ensure access to energy to all by 2022"*. In support of the Ministry's objective, Swaziland's SE4ALL Action Agenda and Investment Prospectus have been developed to be implemented in a six-year period in 2017-2022, with most of the objectives of SE4ALL to

be achieved by 2022, eight years before 2030, the target date set by the UN for Sustainable Energy for All.

The national rate of access to electricity in Swaziland is currently 55% (65% urban and 45% rural). As previously indicated, the power demand in Swaziland is forecasted to rise from 271 MW in 2015 to 323 MW in 2025. The power demand in 2022 is estimated reach 310 MW. With the total installed capacity standing at about 160 MW, over 150 MW additional capacity is required to be installed by 2022. So far, the Swaziland Electricity Company has committed to IPP arrangements for two solar PV generation plants (KaLanga Solar PV and Fibon Solar Power) and one hydro plant (Lower Maguduza Hydro) with a total capacity of 32.95 MW. Opportunities still exist for private sector investment in eleven additional power generation plants with total capacity of 602.85 MW, as indicated in Table 3.3. These proposed power generation plants consist of one coal power plant (300 MW), one large hydro-electric plant (120 MW), two solar PV plants (21 MW; 5 MW), 4 biomass power plants (100 MW; 30 MW; 10 MW; 10 MW); and three mini-hydropower plant (5 MW; 1MW; 0.85 MW).

If 70% of the total proposed power generation capacity (about 445 MW) is available by 2022, Swaziland would have a total generation capacity of about 605 MW (160 MW of current installed generation capacity plus 445 MW additional generation capacity). Thus with an estimated power demand of over 310 MW for Swaziland by 2022, there would be opportunities for Swaziland to export electricity from its excess capacity of about 295 MW through the Southern African Power Pool (SAPP). By 2030, the power demand in Swaziland is expected to be over 400 MW, but the country will still be in a position to satisfy all its electricity demand with the installed generation capacity under this Investment Prospectus, without additional investment in power generation projects.

3.2 Indicative financial returns on investment in potential power generation projects

Table 1 also presents indicative financial returns on investment in the potential power generation projects in Swaziland. The returns are based on average tariffs offered by Independent Power Producers (IPPs) in South Africa, in response to Request for Proposals by the Department of Energy, South Africa in 2013 and 2015. The tariffs offered by the IPPs in South Africa were chosen for the financial analysis of the potential power generation projects, on the basis that Swaziland and South Africa are both members of the Southern African Power Pool (SAPP) which encourages and facilitates the development of a harmonized, competitive electricity market in the Southern African region. It is thus assumed that the caps on the tariffs to be offered by IPPs in Swaziland will be similar to those in South Africa.

All the investments in potential power generation projects will offer internal rates of return (IRR) not less than 12%. The hydropower projects will offer IRR at 27-31%, whilst the solar PV projects will offer IRR at 16-18%. The biomass power plants will offer IRR at 12%. The coal-

based thermal plant will also offer IRR at 12%. The IIR in all cases are not less than the cut-off rate of return of 12% opportunity cost of capital in Swaziland (African Development Bank, 2014) and thus confirms the viability of all the potential investments.

Table 1: Indicative financial returns on investment in potential power generation projects

Expected Commission Year	Project Name	Capacity, MW	Indicative Capital Cost, US\$ million	Approx. Fixed O&M Cost*, \$/kW-yr	Approx. Variable O&M Cost*, \$/MWh	Fixed O&M cost, US\$ million	Variable O&M Cost, US\$ million	Indicative Internal Rate of Return, %
2022	Lubhuku (Coal) Thermal Power Plant	300	973.80	11.34	11.75	3.40	30.87	12
2021	Ngwempisi Hydro Power	120	352.32	1.70	0.00	0.20	0.00	18
N.A	Daroway Hydro Power	5	14.68	0.071	0.00	0.00035	0.00	29
N.A	Lower Maguga Hydro Electric Scheme	1	2.94	0.014	0.00	0.000014	0.00	31
N.A.	Lubovane Hydro Power, Siphofaneni	0.85	2.50	0.012	0.00	0.000010	0.00	27
N.A.	KaLanga Solar PV (WunderSight Project)	21	87.84	0.58	0.00	0.01	0.00	18
2017	Lavumisa Solar PV	5	20.92	0.14	0.00	0.00069	0.00	16
N.A	RSSC Biomass Plant	100	818.00	35.61	15.32	3.56	13.42	12
2019	Montigny Biomass Plant (Usutu)	30	245.40	10.68	4.60	0.32	1.21	13
2018	Symbion Biomass Plant (Havelock)	10	81.80	3.56	1.53	0.04	0.13	12
N.A.	Clean Energy Africa Biomass Plant, Ngodwane	10	81.80	3.561	1.53	0.04	0.13	12
		502.85	2,681.99					

*Source: US Energy Information Administration (2013) Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants

3.3 Lessons from South Africa on attracting investment in renewable energy projects

In 2013, the Department of Energy of South Africa advertised Requests for Proposals in a competitive bidding process to attract private investment in renewable energy projects, under its Renewable Energy Independent Power Project Procurement Programme (REIPPPP). Between 2013 and 2014, the programme secured investment commitments of US\$14 billion to build 3922 MW of new renewable energy generating capacity. This places the programme among the top ten privately funded renewable energy programmes in the world in recent years. Power prices have become competitive over the past few years, and the speed of implementation has been remarkable.

As a fellow member of the Southern African Power Pool (SAPP), South Africa's REIPPPP provides a valuable opportunity for Swaziland to adapt some of the strategies to attract private sector

investment in renewable energy projects quickly and effectively. Not all of the success factors in the South African REIPPPP will be precisely duplicated by Swaziland; some of the factors may be replicated with proxies. Nevertheless, the South African experience does suggest lessons regarding what factors are essential in countries, such as Swaziland, where the government and private sector players are strongly committed to rolling out a renewable energy projects.

The factors that account for the success of South Africa's REIPPPP include:

- High-level political support;
- Sovereign guarantee of Government;
- Support of local financial institutions; and
- Support of international Development Partners and Development Finance Institutions.

4. PIPELINE OF PROJECTS

4.1 Prioritized investment opportunities in Swaziland under SE4ALL

The integrated set of prioritized investment opportunities in Swaziland under SE4ALL is summarized in Table 2, with more details provided in the Annex. The selection and prioritization of the projects were done through comprehensive consultations with a broad range of stakeholders in Swaziland including government and non-government organisations, the private sector, financial institutions and the academia. The 12 high-priority projects are:

1. Install Lubhuku (Coal) Thermal Power Plant;
2. Install Ngwempisi Hydro Plant;
3. Increase access to LPG for cooking;
4. Increase access to improved cookstoves;
5. Implement training programmes to promote productive use of energy;
6. Expand generation capacity from renewable energy sources;
7. Develop renewable energy policy and database;
8. Implement labelling and certification of appliances;
9. Demonstrate benefits and provide incentives for energy efficiency practices;
10. Develop energy efficiency standards for appliances;
11. Create awareness on renewable energy and energy efficiency; and
12. Conduct annual energy surveys, promote gender mainstreaming of energy projects and address other cross-cutting issues.

The projects will benefit, to varying extents, households, communities as well as commercial and industrial sectors in rural and urban areas. The potential investors in the projects are the private sector, government and Swaziland's development partners. It is estimated that out of the total investment of US\$2.71 billion (E41.25 billion) required for the projects, there is great potential for the private sector to contribute US\$2.02 billion (75%), whilst the government contributes US\$548.10 million (20%) and development partners assist with US\$138.86 (5%).

Table 2: Summary of prioritized investment opportunities in Swaziland under SE4ALL

Project no.	1	2	3	4	5	6	6	8	9	10	11	12	
Short title	Expand generation capacity from conventional energy sources		Increase Access to Modern Energy for Cooking		Training Programmes to Promote Productive Use of Energy	Increasing RE in National Energy Mix		Increase Energy Efficiency		Cross-cutting Issues			
	Lubhuku Thermal Power Plant	Ngwempisi Hydro	LPG	Improved Cookstoves		Expand generation capacity from renewable energy	Develop RE Policy & Database	Labelling & Certification of Appliances	Demonstration of EE Benefits / Incentives for EE	Develop Standards for Appliances	Create Awareness on RE & EE	Surveys, Gender Mainstreaming etc.	
Investment budget in US\$ million	973.80	352.32	0.90	6.35	0.65	1355.87	0.75	0.70	5.40	3.00	6.00	6.50	
Potential financing, US\$ million	Gov't	194.76	70.46	0.09	0.64	0.46	271.17	0.53	0.42	1.08	2.10	1.20	5.20
	Private sector	730.35	264.24	0.72	5.08	0.00	1016.90	0.00	0.00	3.78	0.00	4.20	0.00
	Dev't Partners	48.69	17.62	0.09	0.64	0.20	67.79	0.23	0.28	0.54	0.90	0.60	1.30
Total	973.80	352.32	0.90	6.35	0.65	1355.87	0.75	0.70	5.40	3.00	6.00	6.50	
Potential financing, %	Gov't	20	20	10	10	70	20	70	60	20	70	20	80
	Private sector	75	75	80	80		75			70		70	
	Dev't Partners	5	5	10	10	30	5	30	40	10	30	10	20

5. CONCLUSIONS

The Kingdom of Swaziland has one of the friendliest investment climate in Africa, as reflected in the successive “Doing Business” reports of the World Bank. The energy sector present good investment opportunities and the government is very keen to welcome and facilitate the business of potential investors.

The presented Investment Prospectus should be seen as a rolling document within 5-year timeframe (2017-2021). The Energy Department of the Ministry of Natural Resources and Energy is committed to put together a team that will guide and supervise more comprehensive development of the identified and selected High Priority Projects into viable and bankable proposals.

The Investment Prospectus reflects the needs and constraints of the country. All the projects ideas and proposals are proposed by Swaziland-based institutions and groups through comprehensive consultations.

The Government of Swaziland, recognizes the importance of program champions in driving successful programs such as the Swaziland SE4ALL Investment Prospectus. The Government will select a program champion to drive the attraction of investments and implementation of the SE4ALL Investment Prospectus. The person will be someone with credibility needs to be able to interact convincingly with senior government officials, effectively explain and defend the SE4ALL Investment Prospectus in meetings with stakeholders, deal with donors, select and manage consultants, communicate with the private sector, and manage a complicated procurement and contracting process. The person will also be familiar with (and familiar to) senior officials, as well as someone with enough experience working with the private sector to be comfortable adopting a business-friendly approach.

1. INTRODUCTION

1.1 Background

Swaziland is participating in the Sustainable Energy for All (SE4ALL) Initiative of the UN General Assembly, as one of the 43 participating African countries out of 83 countries globally. The Initiative aims at mobilizing action from the global community, governments, the private sector, and civil society around three objectives: i) ensuring universal access to modern energy services; ii) doubling the global rate of improvements in energy efficiency; and iii) doubling the share of renewable energy in the global energy mix, all to be reached by 2030.

In response to the Initiative, the SE4ALL Regional Hub was established by three African Institutions (NEPAD, African Union Commission, and African Development Bank). At a joint meeting of Africa Hub, Global Facilitation Team (GFT) of SE4ALL and SE4ALL partners in 2013, it was agreed that each participating country should develop its SE4ALL Action Agenda and Investment Prospectus (AA/IP). Consequently, the Ministry of Natural Resources and Energy – Department of Energy of Swaziland embarked on a project to facilitate and develop SE4ALL Agenda and Investment Prospectus for Swaziland, with the support of the UNDP. This document is the Investment Prospectus of the Kingdom of Swaziland.

1.2 Methodology for developing the Swaziland SE4ALL IP

The methodology used to prepare the Investment Prospectus was based on the principles of ownership and participation of the various stakeholders in Swaziland. Consultations were held with the stakeholders to raise their awareness on the principles and fundamentals of Sustainable Energy for All (SE4ALL) and to identify high priority energy projects as well as build ownership for these energy projects across the country. Through the consultations, the country Action Agenda was developed to implement the high priority energy projects, from which was distilled the Investment Prospectus for the implementation.

The basis of the Swaziland SE4ALL Action Agenda and the Investment Prospectus includes the SE4ALL Rapid Gap Analysis and Country Action Plan which were initially conducted, followed by further stakeholder consultations under the guidance of the Department of Energy of the Ministry of Natural Resources and Energy. The consultations involved government ministries and their agencies, the private sector including the financial institutions as well as the civic society and communities across the country. The consultations focused on concerns and expectations with respect to the three objectives of the SE4All and were aimed at identifying implementable programs and projects, including their investment requirements.

2. THE INVESTMENT THESIS ON SE4ALL IN SWAZILAND

The investment thesis on SE4ALL in Swaziland provides the general context to the SE4ALL Investment Prospectus for Swaziland, including the policy, legal and regulatory issues relevant to the thesis. The relevant elements of the thesis include:

- Country overview;
- Energy sector trajectory; and
- Investing in Swaziland;
 - Energy Policy and Strategy;
 - Legal and regulatory framework of energy sector;
 - Supporting policies and strategy;
 - Institutional framework of energy stakeholders;
 - Swaziland’s attractive financing and investment framework
 - Government commitment towards private sector

2.1 Country overview

Swaziland is a monarchy with constitutional provisions and Swazi law and Custom, with the His Majesty the King as the Head of State. The three organs of government, as enshrined in the Constitution, are the Executive, a two-tier Legislature and the Judiciary. A participatory, community-based political system, the Tinkhundla, governs the electoral process in Swaziland. The Prime Minister is the Head of the Executive. Swaziland is bordered by Mozambique and South Africa and occupies a geographical size of 17,360 km². Figure 2.1 illustrates the geographic map of Swaziland.

With a young and growing population of approximately 1.27 million people in 2014 and a Gross Domestic Product (GDP) growth rate of 2% in 2014, according to the World Bank, the Kingdom of Swaziland, is considered a middle-income country. The population is largely rural and agriculture is a significant player in the economy. Almost 60% of the country’s revenue is from the Southern African Customs Union (SACU)¹. The regional bloc’s Common Monetary Union directs the member countries’ monetary policy and Swaziland’s currency, the Swazi lilangeni, exchanges at parity with the South African rand.

¹ SACU was formed in 1910 and has as its members; Botswana, Lesotho, Namibia, South Africa and Swaziland



Figure 2.1: Geographic map of Swaziland

Source: WorldAtlas

2.2 Energy sector trajectory

Energy supply remains a challenge as Swaziland imports all its petroleum products and about substantial amounts of its electrical energy requirements. Access to clean energy sources in rural areas still remains about 50%. Almost 100% of the electricity supply from internal generation is from hydropower and sugar cane-based cogeneration.

A review of the National Development Strategy² by the Ministry of Economic Planning and Development (MEPD) revealed that amongst the Strategy's achievements, the national electrification programme had managed to attain a national rate of access to electricity of 55% (65% urban and 45% rural), as well as electrifying all clinics in the country and more than 90% of rural schools. Additionally, the rural electrification programme has stimulated income-generating activities and improved the quality of life of rural dwellers. The Programme was launched to ensure that all parts of the country can access electricity and is continuing with the extension of electricity lines to rural schools, health care facilities, Tinkhundla centres, youth

² MEPD (2013) Swaziland: A Framework for National Development Strategy (NDS) Review

care centres, and densely settled communities around the country, with the objective that developmental impacts are spread out ahead of the progress on household connections.

The Sustainable Energy for All (SE4ALL) initiative provides a platform for Swaziland to address energy access, energy efficiency, and renewable energy in an integrated way, based on the three objectives of the initiative, namely: i) ensuring universal access to modern energy services; ii) doubling the rate of improvements in energy efficiency; and iii) doubling the share of renewable energy in the global energy mix, by 2030.

Swaziland currently imports of the bulk of its power from South Africa and Mozambique, despite being well-endowed with conventional and renewable energy resources, including coal, solar, hydro, wind and biomass residues from the sugar and forestry industries. These resources are potentially able to meet the entire national energy demand if fully exploited, as well as potentially provide for the export of excess capacity to Swaziland’s neighbours. High dependency on power imports contributes significantly to the country’s current account deficit and increases the country’s exposure to energy supply risks, both in terms of supply security and price shocks. These issues were exacerbated in 2013-15, when there was an energy crisis in South Africa.

2.2.1 Renewable energy resource potential of Swaziland

Swaziland has a wide range of untapped renewable energy resources including solar, small hydro, wind, and biomass residues from the sugar and forestry industry. An overview of the key renewable energy resources of Swaziland is presented in Table 2.1.

Table 2.1: Key renewable energy resources in Swaziland

Resource	Energy Application	Comments on Availability
Solar	Electricity and water heating	Abundant resource with a global horizontal irradiance of 4-6 kWh/m ² /day
Wind	Electricity, motive power	Unknown potential, but IRENA estimates average at ~3 meters per second at 10 m height
Hydropower	Electricity	Installed capacity totalling ~60MW from four locations Limited technically exploitable potential of ~110 MW
Biomass (cogeneration)	Electricity	Agricultural waste from local sugar cane and sawmill industries can produce electricity
Biomass (biofuels)	Ethanol for transport	Sugar cane process waste can also produce ethanol
Geothermal	Electricity and water heating	Unknown potential, several hot springs in the country currently used for providing warm water for washing

Source: IRENA, 2014

2.2.1.1 Hydropower

Swaziland has a good experience with small hydropower generation. Since 1970, numerous studies have been conducted to assess its hydropower potential, leading to an estimated theoretical and technical potential of 440 MW and 110 MW, respectively. Of this, 60.4 MW is under operation at present³. As part of its objective to expand the hydropower sector, the Ministry of Natural Resources and Energy (MNRE) has built a database of potential sites. This initially identified 35 candidates, ranging from 32 kW to 1.5 MW. This was further reduced to 26, based on their potential for electricity generation.

2.2.1.2 Biomass

Biomass accounts for 49% of Swaziland's total primary energy supply⁴, and comprises mainly traditional biomass and agro-industrial waste for cogeneration. Woodfuel production in Swaziland has increased by 25% in the last decade, reaching 1,093,333 m³ in 2012. Charcoal production increased by 50% over the same period, reaching 44,933 tonnes.

Traditional biomass is widely used in Swaziland for household heating and cooking, especially in rural areas where it meets about 90% of energy needs. MNRE recognizes the need to improve the efficient use of biomass in rural areas, where most of the firewood is used in open fires and three-legged stoves. It therefore partnered with the German development organization, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), in 2008 to implement the Programme for Basic Energy and Conservation. This focused on the promotion of efficient cookstoves in rural areas with the objective of creating a viable and self-sustaining market (IRENA, 2014). This objective was to be achieved by building the capacity of local producers to manufacture efficient cookstoves, while stimulating demand through an end-user awareness-raising and demonstration campaign.

Apart from woody biomass, three types of crops could play a role in the energy supply chain. These are sugar cane, maize, roots and tubers. Sugar cane is the main crop produced in Swaziland with an annual production of 5.4 million tonnes in 2012. This is followed by maize with 76,000 tonnes and roots and tubers with 57,428 tonnes (see Table 2.2). However, the local production of maize and roots and tubers is entirely used for domestic consumption. In the case of maize, the country has to rely on imports to satisfy local demand.

³ Klunne, J. (2013) Small hydropower in southern Africa - An overview of five countries in the region

⁴ USAID Southern Africa Trade Hub (2015) Strategic Environmental and Social Assessment of Swaziland Renewable Energy and Independent Power Producer Policy

Table 2.2: Swaziland main crop production

Crop/year	2010	2011	2012
Maize (t)	68,000	85,000	76,000
Roots and tubers (t)	55,000	57,428.00	57,428
Sugar cane (t)	4,908,152	4,862,302	5,460,409

Source: FAOSTAT, 2013; Swaziland Sugar Association, 2013

Areas under sugar cane production increased by 30% from 40,000 hectares (ha) in 2010 to 52,000 ha in 2013. This is expected to reach 65,000 ha by 2017 (Swaziland Sugar Association, 2013). According to the Food and Agricultural Organization Statistic Platform (2013), the country has a total agricultural area of 1,222,000 ha, out of which only 190,000 ha is arable land with permanent crops. This, combined with the fact that government and donors have made significant investments in expanding access to irrigation, means sugar production will rise over the next decade.

As indicated in Tables 2.3 and 2.4, the timber industry and sugar industry have potential to provide surplus power of 78 MW and 90 MW, respectively, to the national grid.

Table 2.4: Potential power generation from timber industry

	Location in Swaziland			Total
	North	Central	South	
Forest area, hectares	30,000	50,000	20,000	100,000
Sawmill residues, tonnes	180,000	300,000	120,000	600,000
Forest residues, tonnes	120,000	200,000	80,000	400,000
Potential power production, MW	28	47	18	93
Power consumption of industry, MW	5	7	3	15
Surplus power for the grid, MW	23	40	15	78

Source: Montigny Investments, Swaziland, 2014

Ubombo Sugar Limited, Swaziland, which has an installed capacity of 39.5MW electricity generation from a cogenerating milling facility. The cogeneration facility was commissioned in May 2011 after the signing of an agreement with Swaziland Electricity Company (SEC) to feed 20 GWh per year of electricity into the grid, increasing to a maximum of 52 GWh in 2015.⁵ Royal Swaziland Sugar Corporation's (RSSC) Simunye and Mhlume milling plants collectively handle 3.5 million tons of sugarcane, including 1.2 million tons from out-grower sugarcane production. The potential for cogeneration at the two mills is equally high.

⁵ Ndhlukula, K. and Sampa, R. (2012) Swaziland: Rapid Assessment and Gap Analysis for Renewable Energy Policy

Table 2.4: Potential Power Generation from Sugar Industry

	Location in Swaziland			Total
	Mhlume	Simunye	Big Bend	
Forest area, hectares	20,000	20,000	20,000	60,000
Sugarcane bagasse, tonnes	520,000	520,000	520,000	1,560,000
Sugarcane trash (leaves, etc), tonnes	200,000	200,000	200,000	600,000
Potential power production, MW	48	54	56	158
Power consumption of industry, MW	22	28	18	68
Surplus power for the grid, MW	26	26	38	90

Source: Montigny Investments, Swaziland, 2014

Currently, there is a Biomass Group that comprises the two existing sugar companies (Ubombo Sugar Limited and Royal Swaziland Sugar Corporation), representative of Nsoko Msele Integrated Sugar Project in the Lubombo region (a new sugar mill to be established), the Swaziland Sugar Association and three major players in the Forestry sector (including Montigny Investments). In addition to these bodies, there are a number of smaller players and even potential biomass fuel suppliers that still can form part of this Group. The Forestry sector has been supplying the existing sugar mills with forest residues and mill residues (in the form of wood and wood chips) since 2009, and due to this combined effort, the imported coal as a supplementary fuel to the mills have largely been replaced⁶. The sugar mills have also shown interest in using brown leaves from the sugar cane plantations (often called “trash”) as complementary fuel.

The Biomass Group intends to establish a Control Centre to be responsible for scheduling/accommodating maintenance periods between the biomass-fired power plants and also be a single point of contact if any of the biomass-fired power plants is experiencing difficulty in supplying the agreed capacity. The Control Centre will also be monitoring the quality and the quantity of power fed into the grid.

Molasses are another by-product of the sugar industry with a total of 247,225 tonnes produced in 2013 (Table 2.5). They are predominantly used for ethanol production for the beverage and pharmaceutical industry, but are being also considered for biofuels production. Royal Swaziland Sugar Corporation and USA Distillers are the two major ethanol producers in Swaziland, making 134,000 litres/day and 120,000 litres/day, respectively, with a total production of 60 million litres per year. Fuel grade bioethanol production in Swaziland at present is limited to a pilot bioethanol project run by the Royal Swaziland Sugar Corporation with support from the government. Under pilot run, which has since ended, the project produced 2,444 litres of bioethanol per day. Blending trials with 10% fuel grade ethanol and 90% petrol have been

⁶ Montigny Investments, 2014

successfully conducted as part of this project. A programme scale-up to produce 10,000 litres of anhydrous ethanol per day is now under consideration. The process for Cabinet approval for mandatory blending of vehicle fuel with bioethanol is also underway.

Table 2.5: Sugar industry molasses production

Producer	2008/09	2009/10	2010/11	2011/12	2012/13
RSSC (Simunye mill) (t)	57,190	60,738	65,710	69,876	72,700
RSCC (Mhlume mill) (t)	51,794	55,756	53,982	60,814	63,299
USL (Ubombo mill) (t)	71,669	76,514	80,443	104,351	111,267
Total Industry (t)	1,180,653	193,008	200,134	235,041	247,267

Source: Swaziland Sugar Association, 2013

2.2.1.3 Solar energy

Swaziland has relatively abundant solar potential throughout the country with an estimated Global Horizontal Irradiance of 4-6 kWh/m²/day. The highest irradiation occurs during summer (December-March). The lowest occurs during winter (June-September), but is still adequate for both solar PV and water heating. No ground measurements have yet been carried out to validate satellite data.

The main solar applications developed in Swaziland include Solar Home Systems (SHS) of various sizes and solar water heaters. Through its rural electrification programme, MNRE has installed SHS and solar water heaters in various schools and public institutions across the country. It has been promoting the use of solar PV systems as far back as the early 1990s through an awareness-raising PV demonstration project. This ran from 1992-1995 in cooperation with UNESCO. The objective was to meet the basic electricity needs of people living in the rural communities.

MNRE has also facilitated the installation of slightly larger solar PV systems of i) 25 kW in the village of Bulembu; ii) 32 kW at the Mbabane Blood Bank; iii) 60 kW at the University of Swaziland (Luyengo campus); iv) 32kW at Nhlanguano Health Centre PV system; and v) solar street lights at Ezulwini. It is currently working on installing another 32 kW at the Mhlumeni border post. In 2013-2014, solar streetlights were installed in 8 tinkhundla in a demonstration project by the Government with the assistance of its development partners.

Photovoltaic (PV) systems have undoubtedly the highest potential on top of solar water heating. Swaziland has a huge rural population (55% of the rural population) that still requires clean and sustainable energy which can be delivered with PV through solar homes systems and mini-grids.

2.2.1.4 Wind energy

A wind measurement campaign and data analysis was conducted in 2001 as part of the Swaziland NEP project supported by the Danish Cooperation for Environment and Development. Wind measurements were conducted over a year (2001-2002) on five sites across the country at 10 m, 20 m and 30 m above ground level (Table 2.6).

Table 2.6: Mean annual wind speed in Swaziland

	Area				
	Nhlangano	Siteki	Piggs Peak	Luve	Sithobela
Administrative region	Shiselweni	Lubombo	Hhohho	Manzini	Lubombo
Mean annual speed at 20 m (m/s)	3.9	5.1	3.5	3.7	2.8
Mean annual wind speed at 30 m (m/s)	4.2	5.7	3.8	4.1	3.3
Mean annual wind speed at 50 m (m/s) (extrapolated)	4.6	6.6	4.2	4.7	4.1

Source: IRENA, 2012

Mean annual wind speed at 30 m was 3.3-5.7 m/s and extrapolation to 50 m yielded wind speed of 4.1-6.6 m/s. The highest measurements were recorded at Siteki in the Lubombo Plateau where further measurement at 50 m and above should be undertaken to ascertain wind power potential. Average energy production at Siteki was estimated for 600 kW standard and low wind turbines yielding 800 megawatt hours (MWh) and 1,000 MWh per year, respectively. A standard 1 MW wind turbine yielded an annual energy production of 1,400 MWh per year. Although the overall wind potential is favourable for water pumping applications, wind water pumping is not feasible in most parts of the country due to the low permeability of the aquifers.

2.2.2 Energy efficiency initiatives

In 2012-2015, the MNRE conducted awareness campaigns on energy efficiency practices and benefits. Industrial audits were done for some industries in the country, and the Swaziland Electricity Company (SEC) has installed capacitors for power factor correction for some of their high-load consumers, as part of the national Demand-Side Management (DSM) programme. Prepaid metering has also been initiated for some household consumers.

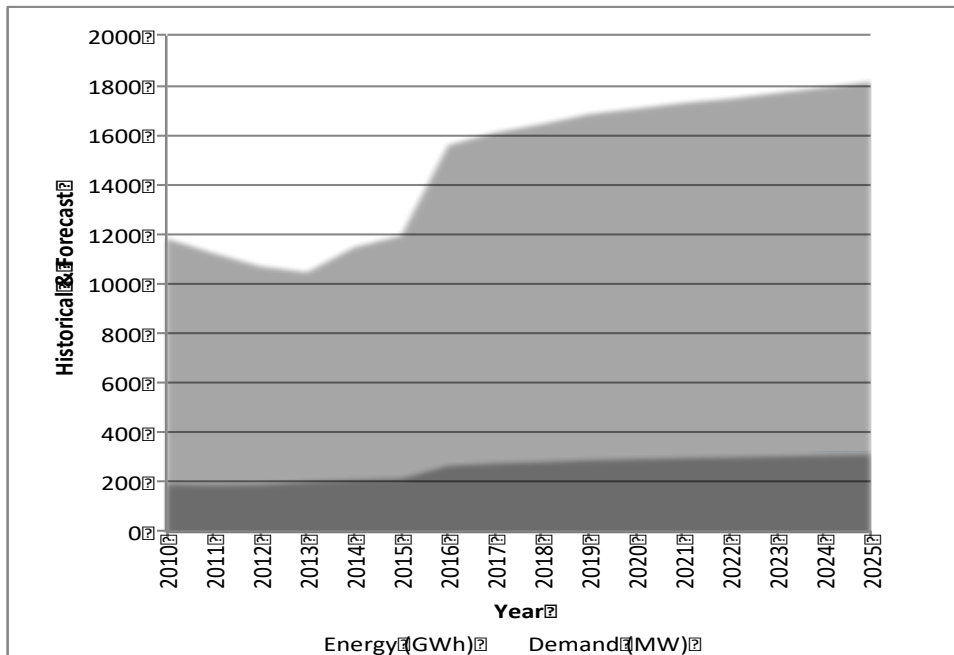


Figure 2.3: Electricity consumption and demand forecast for 2015-2025
 Source: SEC 2015, and SAPP, 2015

Figure 2.4 presents a comparison between imported energy and local generation over the years in Swaziland. Imports have been rising since 2011 (to almost 80% of local generation).

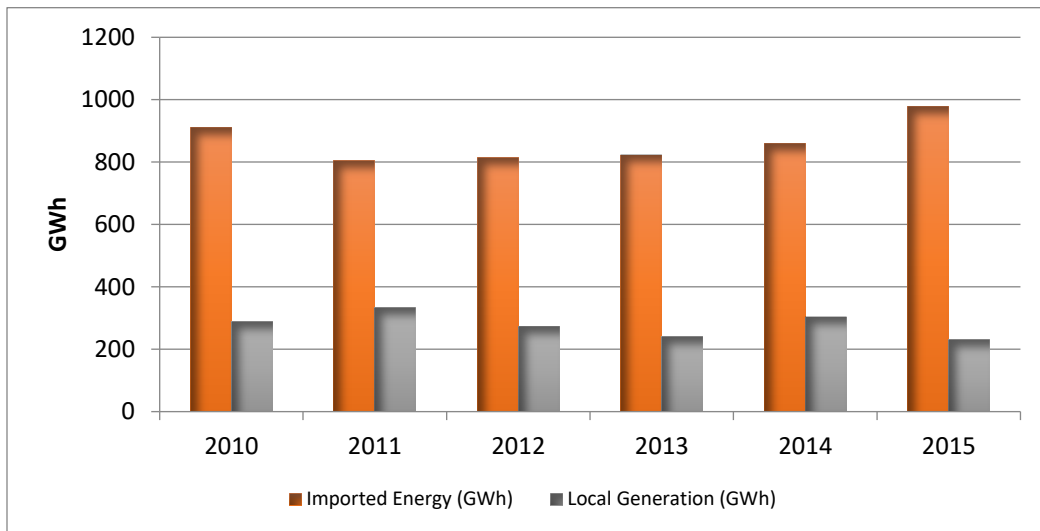


Figure 2.4: Imported energy vs local generation
 Source: Derived from SEC annual report (SEC 2015)

2.3 Investing in Swaziland

The attractiveness of investing in sustainable energy projects in Swaziland is governed by the following favourable characteristics of the country:

- Transparent regulatory and enabling instruments - Policies, strategies, legal and regulatory framework;
- Cost-reflective electricity tariffs;
- Fair and transparent licencing system;
- Well-structured and broad-based institutional framework of energy stakeholders; and
- Swaziland's attractive financing and investment framework.

2.3.1 Energy Policy and Strategy

The overarching development Master Plan of Swaziland is the National Development Strategy (NDS) – Vision 2022, which was developed in 1999. Vision 2022 spells out all the key macro-sectoral strategies that need to be in place so that by the year 2022, the Kingdom of Swaziland would be in the top 10 per cent of the medium human development group of countries founded on sustainable economic development, social justice and political stability. All policies in the energy sector are therefore formulated with the aim of contributing to reaching NDS-Vision 2022 objectives. The country's energy policy environment is governed by the National Energy Policy (NEP), the National Forestry Policy, the National Energy Policy Implementation Strategy (NEPIS) and the National Biofuels Development Strategy.

2.3.1.1 National Energy Policy

The NEP was shaped using stakeholder consultation and participation and it was approved in 2003. It was aimed to overcome the challenges of the energy sector transformation and development. To do so, it set out objectives to stimulate economic growth and development by ensuring energy security and energy access, while encouraging job creation and preserving long-term sustainability and health¹⁰. The policy also recognizes that all locally available renewable energy resources could play a greater role in achieving NEP aims if a conducive framework was in place. This means setting up appropriate financing mechanisms, developing a quality assurance scheme for renewable energy technologies and facilitating conditions for self-generators to provide electricity to the grid as Independent Power Producers (IPPs). The policy also recognizes the importance of building the capacities of various stakeholders and developing a strong information and awareness-raising campaign to support these steps.

2.3.1.2 NEP Implementation Strategy

After NEP was created, MNRE developed National Energy Policy Implementation Strategy (NEPIS) in 2009. Its focus was to develop and implement short-term measures and activities

¹⁰ Ministry of Natural Resources and Energy (2003), National Energy Policy, Government of Swaziland

that will help reach the NEP objectives within three years. The renewable energy component of NEPIS identified the need to develop a renewable energy action plan and targets, including the establishment of fiscal incentives to promote renewables. It also proposed to incorporate renewable energy information and communication programme and standardization in the sector. MNRE also developed a specific Renewable Energy and Independent Power Producers Policy.

The major barriers to the implementation of the National Energy Policy Implementation Strategy have been the lack of funding and overly ambitious targets. The National Energy Policy and the National Energy Policy Implementation Strategy are now being reviewed, with the assistance of the African Development Bank (AfDB) to reflect current developments and revised targets in Swaziland's energy sector. The draft Renewable Energy and Independent Power Producers (RE and IPP) Policy has also been submitted to the Swaziland Cabinet for their consideration for approval process towards implementation. The draft RE and IPP Policy now sets a road map with targets for generation and utilization of renewable energy, and highlights fiscal incentives to encourage private sector investment in the renewable energy subsector. The Swaziland Energy Regulatory Agency (SERA) has been tasked to provide guidelines and operational details of these incentives, in consultations with the Ministry of Natural Resources and Energy (MNRE).

2.3.1.3 Renewable Energy and Independent Power Producers Policy

Swaziland's draft Renewable Energy and Independent Power Producers (RE & IPP) Policy was developed in 2015 and it has been submitted to the Swaziland Cabinet for consideration for the approval process towards implementation. The RE & IPP Policy provides a framework that aims to address barriers to renewable energy development and IPP growth to enable a successful transition of Swaziland's energy matrix towards sustainable energy sources and to open the market to the private sector in a controlled way via IPPs. This is expected to have multiplier effects including direct and indirect socio-economic benefits such as local manufacturing growth, increased access to energy, poverty reduction, employment creation, small and medium enterprise development, and enhanced wealth creation. Additional benefits include the transfer of modern technology and know-how, and the building of new technical capacity for Swaziland.

The overall national goal for the RE & 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 RE&IPP Policy draws from the vision and aspirations outlined in Swaziland's key national development plans and policies, and its main objectives are¹¹:

- Increase the utilization of Swaziland's extensive local renewable energy resources including biomass, solar PV, concentrated solar power (CSP), wind and geothermal resources;
- Promote the deployment of IPP capacity to meet Swaziland's electricity needs and enhance energy security and self-sufficiency by reduced reliance on imports;
- Stimulate and enable the deployment of embedded generation and mini-grid solutions to diversify Swaziland's energy mix and increase energy access potential for rural customers;
- Identify and facilitate access to various funding sources to overcome renewable energy and IPP financing constraints;
- Contribute to the creation of employment possibilities for all residents regardless of sex, either directly in the power sector or created indirectly as a result of the economic activities of the sector;
- Contribute to environmental sustainability and achievement of the green agenda of the NDS and the NEP; and
- Promote access to affordable and sustainable sources of energy to support poverty reduction and economic development.

The major policy positions in the RE&IPP Policy intended to incentivize private sector investment in renewable energy are:

- The electricity licensing framework shall make provision for different licensing classifications, including full licences, licence exemptions and a simplified or fast-track process (e.g. registration) for certain generation licensees to promote RE and IPP market entry;
- In order to facilitate bilateral power trade, the required regulations, methodologies/rules and/or licensing conditions shall be put in place by the GOS
 - to facilitate an efficient and effective grid connection process connection charges approach to enable fair and equitable access to the network(s). This shall complement the Grid Code and Quality of Supply and Service Standards;
- The legislation, licensing framework, regulations and tariff methodology shall make provision for both regulated tariffs and negotiated pricing;

¹¹ USAID and Trade Hub (2015 Swaziland Renewable Energy and Independent Power Producer Policy

- The GOS shall develop long term integrated resource plan (IRP), to serve as a guideline for power sector planners, IPPs and electricity customers. The IRP shall be revised periodically to take account of the rapidly changing market;
- Swaziland shall employ a hybrid procurement approach to new generation capacity, comprising
 - Public competitive bidding processes for “large” IPP projects;
 - Feed-in-Tariffs and/or net-metering for “small” IPP projects and embedded generation;
 - Unsolicited bids, only for smaller opportunistic projects that are able to deliver capacity quickly but that do not lock the country into expensive long term contracts or liabilities;
- In terms of power sector financing, the GOS shall explore all viable financing sources for RE&IPP projects and create a conducive investment environment taking cognizance of the particular needs associated with the financing approach and/or institution;
- The GOS shall establish a Renewable Energy and Access Fund (or Funds) and constitute a Renewable Energy and Rural Electrification Agency to administer the fund(s); and
- The GOS shall, in conjunction with relevant stakeholders, review the various tax and customs obligations as well as deductions, exemptions and special incentives for Renewable Energy and IPP investments. This shall be done as part of a broader process of developing a detailed “Investor’s Handbook for Swaziland.”

2.3.1.4 National Biofuels Development Strategy

The National Biofuels Development Strategy was approved by cabinet in 2011, as part of the effort to promote renewable energy. The Strategy primarily considers the use of biofuels to replace fossil fuels in Swaziland. Key elements of the Strategy include the creation of stakeholder awareness and involvement, establishment of national biofuels institutional and regulatory structures and the creation of policies and strategies for the production, processing and marketing of biofuels¹².

The country imports about 10 million litres of unleaded petrol a month and Royal Swaziland Sugar Corporation (RSSC) has the plant already in place that is capable of producing 300,000 litres of anhydrous ethanol a month. Thus, Swaziland can only blend up to 3% of the unleaded petrol (3% ethanol: 97% unleaded petrol). The Ministry of Natural Resources intends to pursue a phased programme starting with a 3% ethanol blend building up to 10% when sufficient volumes of ethanol are available¹³. Opportunities therefore exist for private investment for additional anhydrous ethanol plants in Swaziland.

¹² Ministry of Natural Resources and Energy) (2008), National Biofuel Development Strategy, Overview”

¹³ MNRE (2016) Ethanol Blending Roll Out Program

Under a 2-year pilot project involving a partnership between MNRE and the RSSC, 10% ethanol blended fuel (E10) was tested in a selection of cars both from Government and RSSC. The cars have performed satisfactorily without any modifications to the engines. The Ministry will soon engage RSSC and the oil industry on the issues of mandatory blending, pricing, wholesale margin, blending infrastructure and related logistics. The engagement will also cover the development of a sustainable model for good returns on the additional investment required to be made by the RSSC and oil industry under the ethanol blending program.

2.3.2 Legal and regulatory framework of energy sector

The Swaziland legal and regulatory energy framework is made up of the following laws:

- Energy Regulatory Act, 2007 and Electricity Act, 2007; and
- 2002 Environment Management Act.

2.3.2.1 Energy Regulatory Act and Electricity Act

The Energy Regulatory Authority Act, 2007 (Act No.2 of 2007) established the Swaziland Energy Regulatory Authority (SERA), with the mandate to administer the Electricity Act, 2007 (Act No.3 of 2007). The Electricity Act, 2007 and the Energy Regulatory Authority Act, 2007 address emerging Independent Power Producers (IPPs) and renewable energy sources and include specific provisions on:

- Regulation of the electricity supply industry, unbundling and open access rules;
- Handling of renewable energy and IPP projects; and
- Creation of a formal tender process for generation, transmission and distribution projects.

The Energy Regulatory Authority Act mandates SERA to prepare bye-laws for different activities as stated in the Electricity Act, including setting tariff and fee frameworks for the generation, transmission and distribution of electricity, an IPP Code, Grid and Distribution Codes, Priority of Dispatch Order Manuals, and a Management Manual of the various Swaziland electricity industry roles.

The Energy Regulatory Act opened electricity generation, transmission and distribution to third parties. SERA is mandated to oversee the electricity sector by, among other things, issuing electricity production licences and regulating national electricity tariffs. The Act stipulates that the Ministry of Natural Resources and Energy must develop a Rural Electrification Strategy and Plan, including i) expansion of the grid; ii) installation of solar PV systems for isolated settlements that cannot be economically connected to the grid; and iii) supply of renewable energy power to the grid and to mini-grids.

2.3.3 Supporting policies and strategy

In addition to the energy policies and strategies, other instruments exist that support the development of the indigenous energy resources of Swaziland. These instruments include:

- Poverty Reduction Strategy and Action Plan;
- Public Private Partnership Policy; and
- Environment Management Act, 2002.

2.3.3.1 Poverty Reduction Strategy and Action Plan

The Poverty Reduction Strategy and Action Plan (PRSAP) of 2007 is another key policy document of the Government of Swaziland (GOS) that supports the implementation of the NDS and the achievement of the then Millennium Development Goals (MDGs), which remain applicable to the current Sustainable Development Goals (SDGs). The PRSAP notes a strong correlation that exists between sources of domestic energy and poverty and identifies a number of specific priority strategies for action:

- Diversification in the use of energy sources in a cost effective manner, moving away from traditional towards more sustainable energy sources;
- Ensuring the supply of energy services in rural areas;
- Providing electricity at affordable prices to improve the rural household energy situation and to attract entrepreneurial activity to rural areas;
- Encouraging efficient use of energy and promoting the adoption of the pre-paid electricity system in order to minimize costs of electricity.

The PRSAP recognizes that energy services are essential to both social and economic development, and much wider access to energy services is critical in achieving nearly all of the SDGs. The PRSAP notes further that renewable energy is not only safe, clean, and environmentally sustainable but can assist in alleviating poverty. In the first instance, for households, it will help improve the quality of life of the poor by providing efficient and clean energy sources, while, in the second instance, it can also assist the poor in generating income as it can be used for commercial and industrial purposes.

2.3.3.2 Public Private Partnership Policy

The Ministry of Finance established the Public Private Partnership policy in 2013 to engage private sector resources to improve and develop infrastructure and service delivery. This policy applies to all ministries and government departments, state-owned and state-controlled enterprises and local authorities, providing them with a means of cooperation with the private sector. The specific aim is to speed up efficient and cost-effective implementation, and management and better services to customers, while allowing the public sector to concentrate on its core function. The Public-Private Partnership Policy offers a favourable environment to encourage private sector investment in Swaziland's energy sector.

2.3.3.3 Environment Management Act, 2002

The Environment Management Act transformed the Swaziland Environment Authority, which was established by the 1992 Environment Act, into a corporate body. The Authority has the mandate to establish a framework for environmental protection and integrate natural resource management, including the promotion of renewable energy in Swaziland. In addition, Swaziland Environment Authority is to establish and administer the Swaziland Environment Fund in accordance with the policies and directions of the Environment Fund's Board.

2.3.4 Cost-reflective electricity tariffs

The Government of Swaziland intends to achieve cost-reflective electricity tariffs by 2017. Annex B presents the current electricity tariff structure in Swaziland. Currently the energy charge in the electricity distribution for domestic consumers is US¢0.08/kWh. The charge for general purpose and small commercial consumers is US¢0.12/kWh, plus facility charges of US\$12-24/month.

With respect to tariffs negotiated under Power Purchase Agreement (PPA) with prospective Independent Power Producers (IPPs), due consideration is given to prevailing electricity generation cost and potential revenues. The negotiations always seek to determine tariffs that are economically viable for both the generation utility and the power off-taker.

2.3.5 Licensing Framework

The process of licensing Independent Power Producers (IPPs) in Swaziland is well-structured, fair and transparent. As summarized in Figure 2.1, the potential IPP submits an application (with supporting documents e.g. company profile, financial statements, EIA reports etc.) to the Swaziland Energy Regulatory Authority (SERA). The application is screened and recommended for the next stages or declined with reasons. The eligible application is then subjected to public review and final approval by the Board of SERA. The IPP is then granted the licence to operate.

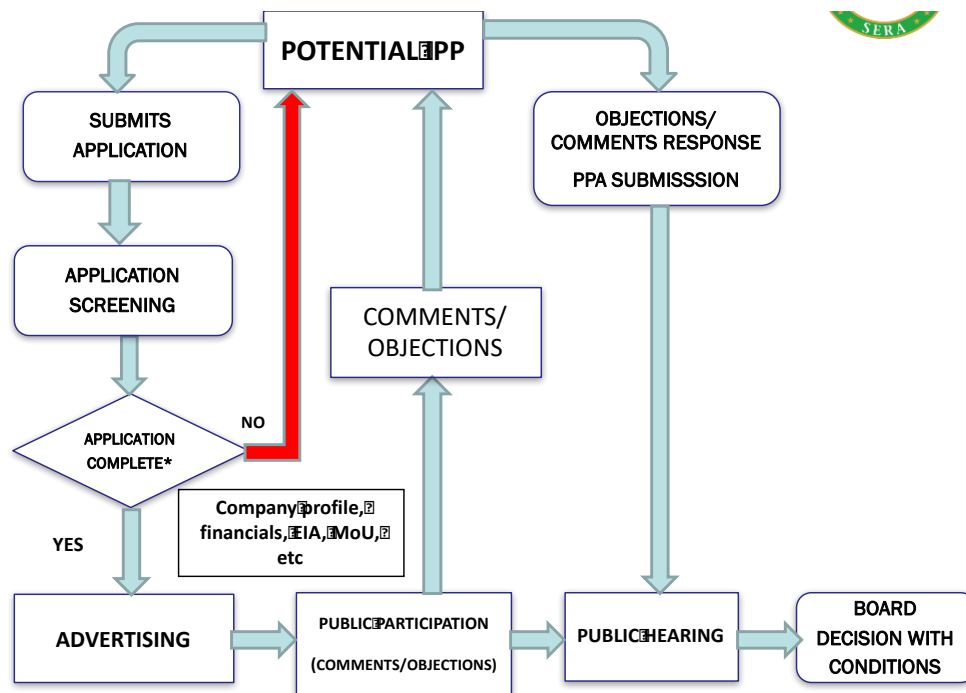


Figure 2.1: Licensing Framework in the Energy Sector of Swaziland

The licence application forms are easily available on the website of SERA, and SERA is mandated to make the determination and respond to the applicant within 120 days. The critical commercial documents required to support licence applications include:

- Fuel Supply Agreement - signed and binding; volumes, quality, frequency;
- Land Ownership/Use - signed and binding; lease or ownership, with valid dates;
- Business Plan – including a bankable feasibility study presenting
 - All sources of debt and equity funding;
 - Geographical location data including maps;
 - Generation profile data;
 - Technology specifications, Engineering designs, and Construction plan;
 - Environmental Impact Assessment;
 - Geology, Hydrology, Logistics; and
 - Maintenance program and Decommissioning Plan;
- Project Plan – including all key milestones, with alignment with PPA, financial model and other agreements
- Audited Financial Statements - up to 3 years, by a credible auditor.

2.3.5 Institutional framework of energy stakeholders

Over the years, Swaziland has developed a well-structured, broad-based and collaborative institutional framework of stakeholders in the energy sector. The energy sector in Swaziland is

mainly governed by the state through different ministry and government-owned agencies. In addition, important stakeholders such as industry associations, research and educational institutes, as well as non-governmental organisations and development partners, are very active. This institutional framework has great potential to ensure the effective deployment of energy technologies for the benefit of a broad cross-section of the population of Swaziland. The key energy stakeholders in Swaziland are:

- Ministry of Natural Resources and Energy (MNRE);
- Swaziland Energy Regulating Authority (SERA);
- Swaziland Electricity Company (SEC);
- Ministry of Tourism and Environmental Affairs;
- Swaziland Environment Authority;
- Ministry of Agriculture and Cooperatives;
- Ministry of Finance and Ministry of Economic Planning;
- Swaziland Standards Authority (SWASA);
- Swaziland Sugar Association;
- Montigny Investments Limited;
- University of Swaziland and technical colleges;
- Renewable Energy Association of Swaziland (REASWA);
- Bulembu Ministries Swaziland; and
- International development partners.

Ministry of Natural Resources and Energy (MNRE): The mission of the energy department of the Ministry of Natural Resources and Energy is to effectively manage national energy resources. It is also to work towards affordable and sustainable energy provision for all inhabitants while ensuring the international competitiveness of the energy sector.

Swaziland Energy Regulating Authority (SERA): SERA was established to put in place the regulatory framework on electricity matters, issue electricity production licences and regulate electricity tariffs in the local market. Electricity industry deregulation is another of its tasks.

Swaziland Electricity Company (SEC): SEC is engaged in electricity generation, transmission and distribution in the Kingdom of Swaziland.

Ministry of Tourism and Environmental Affairs: This Ministry takes the lead in maintaining a coherent and up-to-date forest policy and legal framework, as well as a national forest inventory and management. It is also in charge of collecting weather and climate data through its meteorological department.

Swaziland Environment Authority: The mandate of Swaziland Environment Authority is to coordinate the activities of all organisations working on environmental matters in Swaziland. It is the focal point for liaising with international organisations on environmental concerns.

Ministry of Agriculture and Cooperatives: The Ministry of Agriculture is one of the key ministries in renewable energy production, as it is responsible for renewable energy resources such as bagasse, bioethanol and biogas.

Ministry of Finance and Ministry of Economic Planning: These two ministries are very important to national development, and are responsible for development priorities, financial planning and budget allocations. The development of a green economy depends on these ministries.

Swaziland Standards Authority (SWASA): SWASA is in charge of all activities related to product and service standards in Swaziland. Renewable energy deployment, being technology driven, stands to benefit from SWASA.

Swaziland Sugar Association: The Swaziland Sugar Association is an umbrella organization bringing together all growers and millers of sugarcane. It is committed to consistently meeting the requirements and expectations of sugar industry principals, customers and other stakeholders by providing quality products and services in an efficient, cost-effective and sustainable manner.

Montigny Investments Limited is a Swazi-owned and operated diversified timber company; it is the largest private timber owner-operator in Southern Africa. Of Montigny's more than 85,000 ha of land, 55,000 ha are under active timber management. Plantations extend from Nhlangano in southern Swaziland, to the Usutu region in the North. Montigny owns four sawmills at Bhunya and Nhlangano, one Essential Oil plant, one chipping plant, one chipboard plant and a rented sawmill at Bulembu.

University of Swaziland and technical colleges: The university contributes to policy and strategy development, and also assists in the implementation of projects on the ground. The technical colleges produce technicians in a variety of fields including plumbing, electrical works, surveying and construction.

Renewable Energy Association of Swaziland (REASWA): REASWA is an NGO, whose mission is to promote sustainable energy through energy efficiency and the cost-effective use of renewable energy in an environmentally sustainable and socially acceptable manner. The organization consists of a cross-section of stakeholders from government, the private sector, NGOs and tertiary institutions.

Bulembu Ministries Swaziland: This is an NGO restoring the town of Bulembu to a self-sustaining community through the provision of quality education, health services and employment, while also promoting renewable energy use.

International development partners: These include, among others, United Nations Development Programme, United Nations Industrial Development Organization, USAID, the US Trade and Development Agency, the World Bank, Deutsche Gesellschaft für Internationale Zusammenarbeit, Government of Taiwan and Scandinavian organisations.

2.3.5 Swaziland's attractive financing and investment framework

Around US\$50 million has been invested in the energy sector in Swaziland over the past five years. Of this, 79% is attributed to Swaziland Electricity Company (SEC) and 21% to the government and development partners. The bulk of these investments have been geared towards grid intensification and demand side management projects funded and implemented by SEC. The Swaziland Investment Promotion Authority (SIPA) is the one-stop shop for both domestic and foreign investors to source information related to doing business in Swaziland, including the provision of, or recommendation for, investment incentives.

2.3.5.1 Investment incentives in Swaziland

The investment incentives in Swaziland include:

- Duty-free access on capital goods and raw materials;
- Repatriation of profits and legal protection of investments;
- Human resources training rebate; and
- Development approval order.

Duty-free access on capital goods and raw materials: Capital goods imported into the country for productive investments are exempt from import duties.

Repatriation of profits and legal protection of investments: The liberalized foreign exchange mechanisms allow full repatriation of profits and dividends of enterprises operating in Swaziland. Repatriation is also allowed for salaries of expatriate and capital repayments. Investments in Swaziland are protected from undue expropriation under the Swaziland Investment Promotion Act of 1998. In addition, Swaziland is a member of the World Bank's Multilateral Investment Guarantee Agency, which provides for added legal protection of investments.

Human resources training rebate: The Commissioner of Taxes approves a tax rebate of 150% on the cost of training schemes.

Development approval order: The government of Swaziland has identified specific areas to bolster local and foreign direct investment, and a special corporate tax incentive exists for these

areas. The Minister of Finance has the prerogative to nominate a certain investment company as critical to the development of Swaziland, and thus, with cabinet approval, provide it with a minimum tax rate of 10% for ten years on withholding taxes. This relates to investments such as manufacturing, mining, agribusiness, tourism and international financial services. There are good prospects that this tax incentive can be extended to investments in universal access to modern energy services, renewable energy and energy efficiency.

2.3.5.2 Ease of doing business in Swaziland

Globally, Swaziland stood in 2015 at 105 in the ranking of 189 economies on the ease of doing business (an improvement from 134 in 2012). The country’s with “Distance to Frontier” score (that benchmarks economies with respect to regulatory practice) of 59.1, which is higher than the regional average of 49.7 in sub-Saharan Africa (see Figure 2.5).

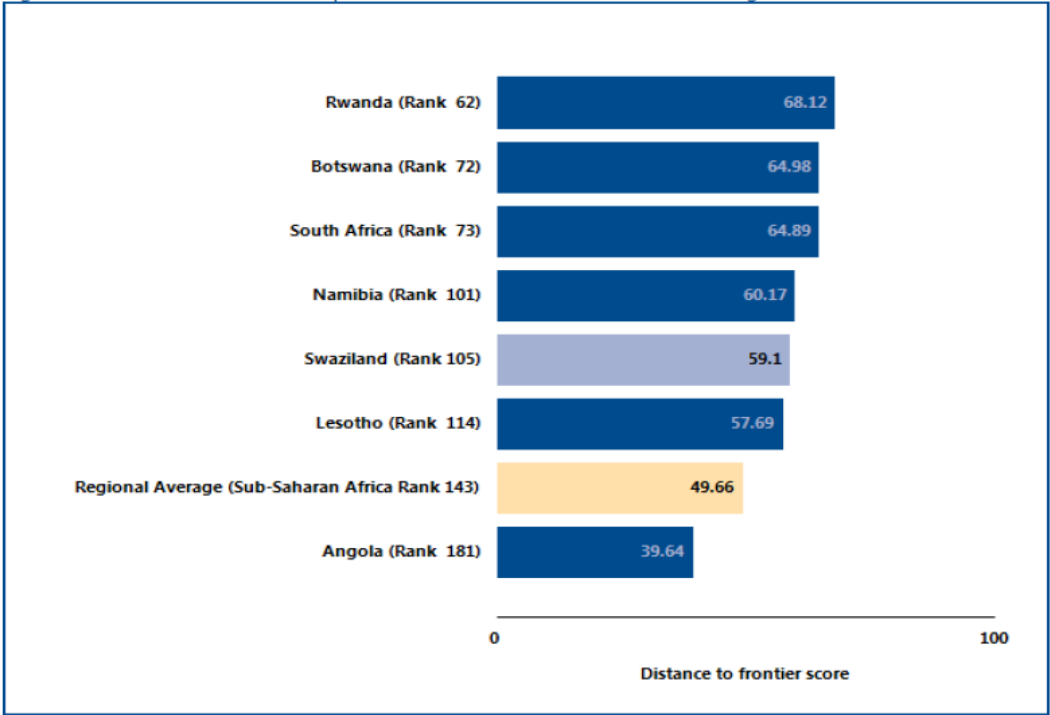


Figure 2.5: How Swaziland and comparator economies rank on the ease of doing business
 Source: World Bank, 2015)

In 2014, Swaziland made starting a business easier by shortening the administrative processing times for registering a new business and obtaining a trading license. In 2015, it also shortened the notice and objection period for obtaining a new trade license. Swaziland also ranks relatively high in “Doing Business” areas in “Trading Across Borders” (30), “Getting Credit” (70) and “Dealing with Construction Permits” (80) (see Figure 2.6 and Figure 2.7).

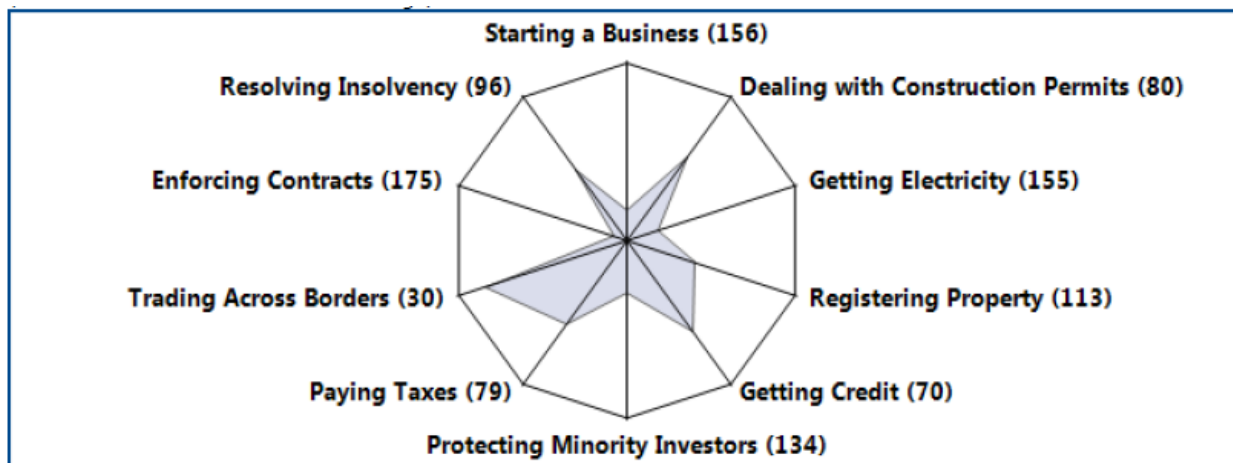


Figure 2.6: Rankings on Doing Business topics - Swaziland (Scale: Rank 189 centre, Rank 1 outer edge)

Source: World Bank, 2015

The score on “Getting Credit” reflects on the effectiveness of frameworks that facilitate access to credit and improve its allocation, i.e. credit information systems and borrowers and lenders in collateral and bankruptcy laws.

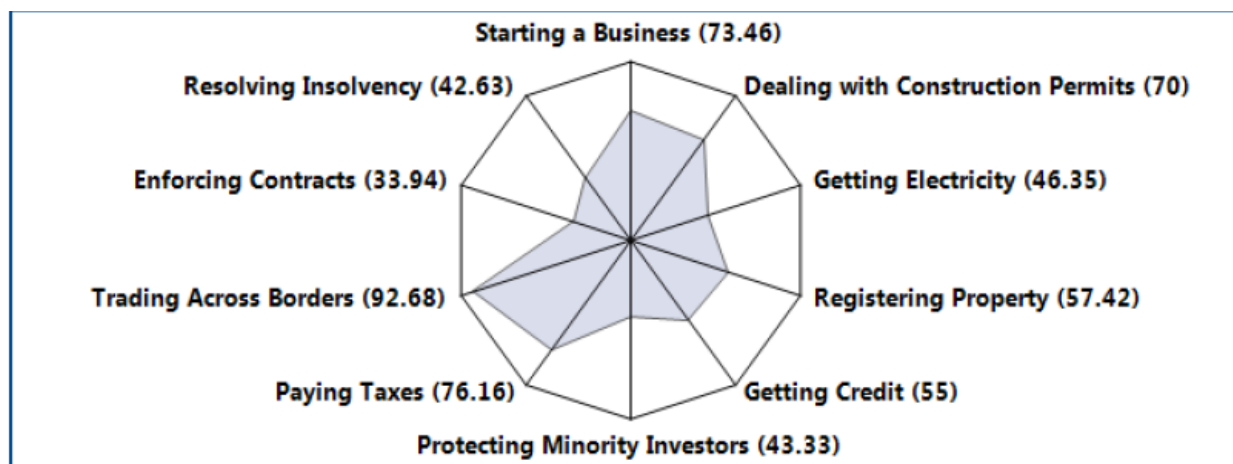


Figure 2.7: Distance to frontier scores on Doing Business topics - Swaziland (Scale: Score 0 centre, Score 100 outer edge)

Source: World Bank, 2015

The score on “Trading Across Borders” reflects the effectiveness of tools to facilitate trade—including single windows, risk-based inspections and electronic data interchange systems. These tools help improve the trading environment and boost firms’ international competitiveness. The score on “Dealing with Construction Permits” reflects the efficiency of the regulation of construction, including the evaluation of the quality of building regulations, the

strength of quality control and safety mechanisms, liability and insurance regimes, and professional certification requirements.

The good ratings of Swaziland in terms of “Ease of Doing Business” hold good prospects to encourage investment in universal access to modern energy services, renewable energy and energy efficiency in Swaziland.

2.3.6 Government commitment towards private sector

In the 2015 Budget speech, the Minister of Finance of Swaziland emphasized that, in the national quest in building a strong and resilient economy, *“the strategy to improve Swaziland’s competitiveness will focus on interlinked actions to reduce the cost of doing business”*¹⁴. He also indicated that electricity costs and supply are the primary concern of many businesses in the country, and the Government will *“continue to explore new generation opportunities, while continuing to increase the number of Swazis with access to electricity”*. He mentioned that the participation of Independent Power Producers (IPPs) has been encouraged by Government, and that some of the IPPs have successfully negotiated Power Purchase Agreements (PPAs).

In His Speech from the Throne in 2015, His Majesty the King also stressed the serious need to invest in local generation of power, as importing power could no longer be guaranteed. He mentioned that *“while the Government is engaged in the process of looking into new energy sources, consideration should be given to additional hydro-generation, renewable energy, as well as thermal power generation, just to mention a few.”*¹⁵

The commitment of the Government towards the energy sector is based on His Majesty’s Government’s Programme of Action 2013-2018, which stated that the *“Government’s commitment to electricity self-sufficiency is irreversible and is strengthened by our awareness of the long-term fragility of existing power supply agreements.”*¹⁶

The level of commitment of the Government of Swaziland demonstrated through His Majesty’s Government’s Programme of Action 2013-2018 offers great potential for investments in the Kingdom on universal energy access, renewable energy and energy efficiency in the Kingdom to address the objectives of Sustainable Energy for All. This commitment has also been further strengthened through the 2015 Budget Speech and 2015 Speech from the Throne.

¹⁴ Government of Swaziland (2015) Budget Speech 2015

¹⁵ Government of Swaziland (2015) Speech from the Throne, 2015

¹⁶ Government of Swaziland (2014) His Majesty’s Government’s Programme of Action 2013-2018

3. THE SE4ALL INITIATIVE FOR SWAZILAND

The Kingdom of Swaziland is one of the Sub-Saharan African countries that have embraced the Sustainable Energy for All (SE4ALL) initiative, which has three objectives, namely i) Ensuring universal access to modern energy services; ii) Doubling the rate of improvements in energy efficiency; and iii) Doubling the share of renewable energy in the global energy mix. Swaziland embarked on the SE4ALL Rapid Assessment and Gap Analysis and subsequently developed a Country Action Plan on SE4ALL in Swaziland in 2014.

3.1 Targets towards SE4ALL

The SE4ALL Rapid Assessment and Gap Analysis identified priority intervention areas to accelerate the attainment most of the goals of SE4ALL before 2030. The priority intervention areas cover where the removal of critical bottlenecks are likely to yield the highest and most widespread impacts on people's living conditions and economic livelihoods, particularly in underserved rural communities and households. The Government of Swaziland is committed to support and promote projects to contribute towards the objectives of the SE4ALL, with the active participation of the private sector, for the benefit of all the citizens of the country. The targets set by Swaziland towards SE4ALL for its people are summarized in Table 3.1.

In line with Swaziland's Vision 2022, one of the key objectives of the Ministry of Natural Resources and Energy is "to ensure access to energy to all by 2022¹⁷". In support of the Ministry's objective, Swaziland's SE4ALL Action Agenda and Investment Prospectus have been developed to be implemented in a six-year period in 2017-2022, with most of the objectives of SE4ALL to be achieved in 2022, eight years before 2030, the target date set by the UN for Sustainable Energy for All.

The national rate of access to electricity in Swaziland is currently 55% (65% urban and 45% rural). As previously indicated, the power demand in Swaziland is forecasted to rise from 271 MW in 2015 to 323 MW in 2025¹⁸. The power demand in 2022 is estimated reach 310 MW. With the total installed capacity standing at about 160 MW, over 150 MW additional capacity is required to be installed by 2022. So far, the Swaziland Electricity Company has committed to IPP arrangements for two solar PV generation plants (KaLanga Solar PV and Fibon Solar Power) and one hydro plant (Lower Maguduza Hydro) with a total capacity of 32.95 MW as indicated in Table 3.2. Opportunities still exist for private sector investment in eleven additional power generation plants with total capacity of 602.85 MW, as indicated in Table 3.3. These proposed

¹⁷ Kingdom of Swaziland (2013) His Majesty's Government Programme of Action 2013-2018: Ministries' Action Plans to 2018 and 2022

¹⁸ Economic Consulting Associates (2009) South African Power Pool (SAPP) Transmission and Trading Case Study – prepared for ESMAP

power generation plants consist of one coal power plant (300 MW), one large hydro-electric plant (120 MW), two solar PV plants (21 MW; 5 MW), 4 biomass power plants (100 MW; 30 MW; 10 MW; 10 MW); and three mini-hydropower plant (5 MW; 1MW; 0.85 MW).

If 70% of the total proposed power generation capacity (about 445 MW) is available by 2022, Swaziland would have a total generation capacity of about 605 MW (160 MW of current installed generation capacity plus 445 MW additional generation capacity). Thus with an estimated power demand of over 310 MW for Swaziland by 2022, there would be opportunities for Swaziland to export electricity from its excess capacity of about 295 MW through the Southern African Power Pool (SAPP). By 2030, the power demand in Swaziland is expected to be over 400 MW, but the country will still be in a position to satisfy all its electricity demand with the installed generation capacity under this Investment Prospectus, without additional investment in power generation projects.

Table 3.1: SE4ALL targets of Swaziland

<p>Energy access</p>	<ul style="list-style-type: none"> • Minimum of 5,000 households connected to grid electricity per annum to reach 18,500 additional households by 2018, reaching 75% access to electricity at household level • Build a 300 MW coal power plant to enhance security of supply by 2018 • 100% access to electricity at household level attained by 2022 • Effective policies and incentives for improved cook stoves established by end 2016 • Regulatory structures and mechanisms for LPG established by end 2016 • Penetration of improved cook stoves increased by 10% per year from 2017 • Penetration of LPG for cooking increased by 10% per year from 2017 • GIS database for rural energy access developed by 2017 • Rural energy master plan and implementation strategy to attain universal access to energy including LPG, improved cook stoves, SHS and biogas developed by 2018 • 100% access to clean energy at household level attained by 2030
<p>Renewable energy</p>	<ul style="list-style-type: none"> • Solar and wind maps developed by 2016 • 46 MW solar PV power plant (IPP) on line by 2017 • 20% of all public buildings to have solar water heating by 2018 • 134 MW hydro (SEC) by 2019 • 130 MW co-generation from bagasse (IPP) by 2020 • 80 MW from wood waste from IPPs (with 40 MW online by 2019) • 10 % ethanol blending by 2016 • 50% renewable energy penetration in the energy mix by 2030
<p>Energy efficiency</p>	<ul style="list-style-type: none"> • Attain 60 GWh energy saving per year by 2018 • Attain 180 GWh energy savings per year by 2025 • EE policy and regulations developed by 2019 • 500,000 LEDs to households distributed by 2020 • Design and adopt an energy efficiency appliance labelling and standards programme
<p>Relevant nexus targets</p>	<ul style="list-style-type: none"> • Update the National Energy Policy by 2016 • Develop a National Integrated Resource Plan by 2016 • Promote solar crop drying, solar and wind water pumping to increase food security • Promote efficient solar lighting kits to improve on- and enhance education, health and gender security • Enhance research capability in climate change modelling and adaptation for the energy sector • Develop standards, codes and frameworks to ensure quality, reliability and safety of energy supply

Source: MNRE, 2015

Table 3.2: Committed renewable energy projects in Swaziland

Year of Commission	Project Name	Capacity (MW)	Current Status
2016	Ka-Langa Solar PV Project	0.95	Power Purchase Agreement (PPA) signed Generation License issued Construction started in Aug 2015
N.A.	Fibon Solar Power	20	Tariff negotiation finalized. PPA signed. IPP finalising land purchase with seller IPP seeking Government Guarantee / other state commitments Construction to start in 2016
2018	Lower Maguduza Hydro	12	Awarded to successful bidder (AIIM/OMIGSWA) EIA report submitted Construction to start after (Certificate of Compliance, Government Guarantee and land acquisition)
Total		32.95	

Table 3.3: Investment opportunities in the energy sector of Swaziland

Expected Commission Year	Project Name	Capacity (MW)	Current Status
2022	Lubhuku Thermal (Coal) Power Plant	300	Coal prospecting to be completed with full report within 2 nd quarter 2016 Preliminary result reveal enough coal reserves to warrant full feasibility study Laboratory tests conducted
2021	Ngwempisi Hydro	120	Prefeasibility funding secured from AfDB by GoS Requests for Proposals assessed by Preferred bidder selected GoS & SEC; results sent to AfDB Prefeasibility Study to be completed in 2016
N.A	Daroway Hydro Power	5	PPA being negotiated with SEC
N.A	Lower Maguga Hydro Electric Scheme	1	Awaiting Response from IPP on Feasibility Study
N.A.	Lubovane Hydro Power, Siphofaneni	0.85	Feasibility Study completed
	KaLanga Solar PV (WunderSight Project)	21	Tariff negotiations finalised & PPA signed IPP to apply for Generation License to SERA IPP is seeking financiers for the project Environmental Impact Assessment to start in June 2016 Lease agreement finalized, awaiting approval
2017	Lavumisa Solar PV	5	SEC appoints consultant for feasibility study Study to be concluded in 2016
N.A	RSSC Biomass Generation	100	MoU signed with SEC
2019	Montigny Biomass Plant (Usutu)	30	MoU signed with SEC
2018	Symbion Biomass Plant (Havelock)	10	MoU signed with SEC
N.A.	Clean Energy Africa Biomass Plant, Ngodwane	10	MoU signed with SEC
Total		602.85	

Source: MNRE, 2016

3.2 Indicative financial returns on investment in potential power generation projects

Table 3.3 and Figure 3.1 present potential financial returns on investment in potential power generation projects in Swaziland listed in Table 3.2. The returns are based on average tariffs offered by Independent Power Producers (IPPs) in South Africa, in response to Request for Proposals by the Department of Energy, South Africa in 2013 and 2015. The tariffs offered by the IPPs in South Africa were chosen for the financial analysis of the potential power generation projects, on the basis that Swaziland and South Africa are both members of the Southern African Power Pool (SAPP) which encourages and facilitates the development of a harmonized,

competitive electricity market in the Southern African region. It is thus assumed that the caps on the tariffs to be offered by IPPs in Swaziland will be similar to those in South Africa.

Table 3.4: Indicative financial returns on investment in potential power generation projects

Expected Commission Year	Project Name	Capacity, MW	Indicative Capital Cost, US\$ million	Approx. Fixed O&M Cost*, \$/kW-yr	Approx. Variable O&M Cost*, \$/MWh	Fixed O&M cost, US\$ million	Variable O&M Cost, US\$ million	Indicative Internal Rate of Return, %
2022	Lubhuku (Coal) Thermal Power Plant	300	973.80	11.34	11.75	3.40	30.87	11.79
2021	Ngwempisi Hydro Power	120	352.32	1.70	0.00	0.20	0.00	17.83
N.A	Daroway Hydro Power	5	14.68	0.071	0.00	0.00035	0.00	29.10
N.A	Lower Maguga Hydro Electric Scheme	1	2.94	0.014	0.00	0.000014	0.00	31.10
N.A.	Lubovane Hydro Power, Siphofaneni	0.85	2.50	0.012	0.00	0.000010	0.00	26.86
N.A.	KaLanga Solar PV (WunderSight Project)	21	87.84	0.58	0.00	0.01	0.00	17.91
2017	Lavumisa Solar PV	5	20.92	0.14	0.00	0.00069	0.00	16.15
N.A	RSSC Biomass Plant	100	818.00	35.61	15.32	3.56	13.42	11.68
2019	Montigny Biomass Plant (Usutu)	30	245.40	10.68	4.60	0.32	1.21	13.30
2018	Symbion Biomass Plant (Havelock)	10	81.80	3.56	1.53	0.04	0.13	11.74
N.A.	Clean Energy Africa Biomass Plant, Ngodwane	10	81.80	3.561	1.53	0.04	0.13	11.74
		502.85	2,681.99					

*Source: US Energy Information Administration (2013) Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants

Table 3.5: Average Tariff for Independent Power Producers (IPPs)

Power Generation Technology	Average Tariff for IPPs	
	USc/kWh	US\$/MWh
Coal*	7.09	70.93
Wind**	7.50	75.00
Solar PV**	10.00	100.00
Concentrated solar power (CSP)**	16.60	166.00
Small hydro < 20MW**	13.00	130.00
Large hydro > 20MW***	7.00	70.00
Biomass**	10.53	105.26

* Source: Macfarlanes (2015) South Africa's Coal Baseload Procurement Programme officially launched

**Source: World Bank (2014) South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons

*** Source: US Dept. of Energy and National Renewable Energy Laboratory (2015) Cost-of-Generation Database

All the investments in potential power generation projects will offer internal rates of return (IRR) not less than 12%. The hydropower projects will offer IRR at 27-31%, whilst the solar PV projects will offer IRR at 16-18%. The biomass power plants will offer IRR at 12%. The coal-based thermal plant will also offer IRR at 12%. The IIR in all cases are not less than the cut-off rate of return of 12% opportunity cost of capital in Swaziland (African Development Bank, 2014) and thus confirms the viability of all the potential investments.

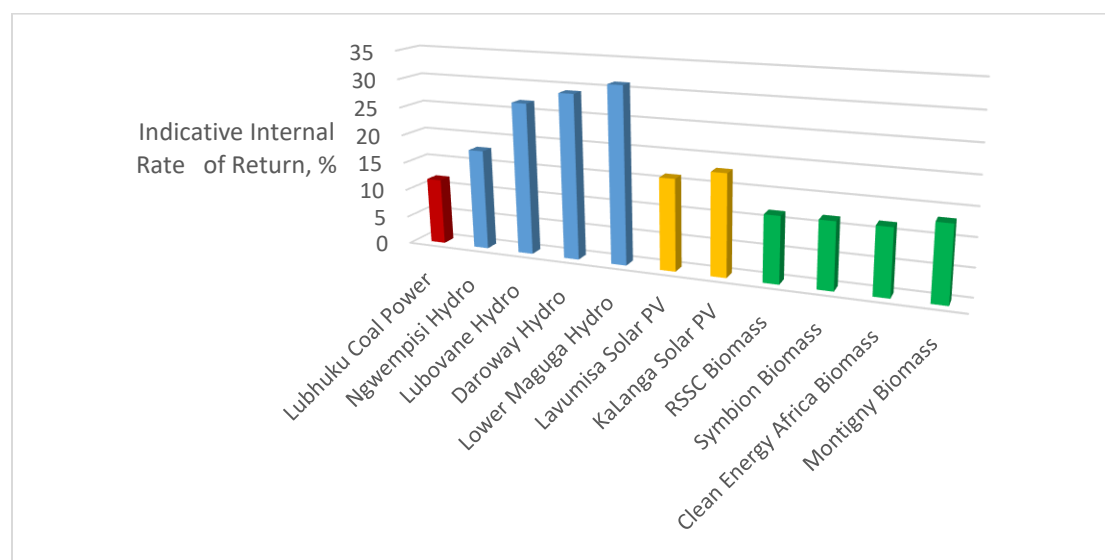


Figure 3.1: Indicative financial returns on investment in potential power generation projects in Swaziland

3.3 Available funding

For rural electrification projects, US\$10.67 million is available to complement private sector investments. The sources of funding for these projects are the Republic of China (Taiwan), the Micro Projects Coordination Unit and the Regional Development Fund, as summarized in Table 3.6. Under Swaziland’s Rural Electrification Programme, over 12,000 households per annum are provided access to electricity.

Table 3.6: Available funding for rural electrification

Funding Source	Funding Available		Capital Contribution Required	
	E million	US\$ million	E million	US\$ million
Ministry of Natural Resources & Energy / Republic of China	45.00	3.00*	0.00	0.00
Micro Projects Coordination Unit	70.00	4.67	7.00**	0.47
Regional Development Fund	45.00	3.00	4.5**	0.3
Total	160.00	10.67	11.50	0.77

* Republic of China is providing US\$3.00 million per annum until 2017

** Capital requirement at 10%

3.3 Lessons from South Africa on attracting investment in power generation projects

In 2013, the Department of Energy of South Africa advertised Requests for Proposals in a competitive bidding process to attract private investment in power generation projects based on renewable energy, under its Renewable Energy Independent Power Project Procurement Programme (REIPPPP). Between 2013 and 2014, the programme secured investment commitments of US\$14 billion to build 3922 MW of new renewable energy generating capacity. This places the programme among the top ten privately funded renewable energy programmes in the world in recent years. Power prices have become competitive over the past few years, and the speed of implementation has been remarkable.

As a fellow member of the Southern African Power Pool (SAPP), South Africa's REIPPPP provides a valuable opportunity for Swaziland to adapt some of the strategies to attract private sector investment in renewable energy projects quickly and effectively. Not all of the success factors in the South African REIPPPP will be precisely duplicated by Swaziland; some of the factors may be replicated with proxies. Nevertheless, the South African experience does suggest lessons regarding what factors are essential in Swaziland, where the government and private sector players are also strongly committed to rolling out renewable energy projects.

The factors that account for the success of South Africa's REIPPPP include:

- High-level political support;
- Sovereign guarantee of Government;
- Support of local financial institutions; and
- Support of international Development Partners and Development Finance Institutions.

3.3.1 High-level political support

The REIPPPP benefited tremendously from high-level political support, in the form of a relatively long history of policy statements and commitment on renewable energy by the President of South Africa and other policy makers. With comparable demonstrated commitment of the King and other political leaders of Swaziland, similar high-level political support for renewable energy projects is expected in Swaziland.

3.3.2 Sovereign Guarantee

The political will behind the REIPPPP was given practical shape in the form of sovereign guarantees in the Implementation Agreements backing South African Eskom's purchase of power from the renewable energy projects. The National Treasury's Fiscal Liability Committee that formally approved the issuing of the government guarantee scrutinized the transactions. Also, with South Africa's relatively strong international credit standing, banks and investors accept sovereign country risk without requiring political risk insurance.

3.3.3 Support of local financial institutions

South Africa's local financial institutions also played a large role in the success of the REIPPPP. The sector is highly liquid, offers long-term debt (15 to 17 years for REIPPPP projects), understands project finance, and has experience with PPPs and private finance of public infrastructure. The sector also includes a small, but functioning secondary market in bonds and syndicated paper. While the industry is perceived to be conservative, it has been essential in helping REIPPPP achieve so many closed transactions in a relatively short period of time. The local financial institutions in Swaziland have the potential to offer similar support to implement Swaziland's SE4ALL Investment Prospectus.

3.3.4 Support of international Development Partners and development finance institutions

The public policy aspects of renewable energy, particularly the perceived need to use it in mitigating climate change, have generated interest in renewable energy among members of the international donor community, including international Development Partners and development finance institutions (DFIs). Even though renewable energy generation is already a worldwide commercial industry, in some cases this interest on the part of donors and DFIs translates into the willingness to use grants, concessional finance or innovative financial instruments to promote the expanded use of renewable energy. REIPPPP benefited to an extent from early-stage donor funding of technical assistance, as well as the involvement by DFIs (e.g. the IFC) as project financiers.

Donors and DFIs have also discussed the idea of issuing bonds to help with the refinancing of existing REIPPPP project debt, and the creation of donor-capitalized facilities to provide subsidized transaction support and project credit enhancements. In early 2014, the South African government issued a tender to design and structure a fund that would facilitate DFI participation in future REIPPPP windows. Similarly, opportunities exist for Swaziland to engage its network of Development Partners and DFIs to source funding for its power generation projects.

4. Pipeline of Projects

4.1 Prioritized investment opportunities in Swaziland under SE4ALL

The integrated set of prioritized investment opportunities in Swaziland under SE4ALL is summarized in Table 4.1, with more details provided in Annex 1. The selection and prioritization of the projects were done through comprehensive consultations with a broad range of stakeholders in Swaziland including government and non-government organisations, the private sector, financial institutions and the academia. The 12 high-priority projects are:

1. Install Lubhuku (Coal) Thermal Power Plant;
2. Install Ngwempisi Hydro Plant;
3. Increase access to LPG for cooking;
4. Increase access to improved cookstoves;
5. Implement training programmes to promote productive use of energy;
6. Expand generation capacity from renewable energy sources;
7. Develop renewable energy policy and database;
8. Implement labelling and certification of appliances;
9. Demonstrate benefits and provide incentives for energy efficiency practices;
10. Develop energy efficiency standards for appliances;
11. Create awareness on renewable energy and energy efficiency; and
12. Conduct annual energy surveys, promote gender mainstreaming of energy projects and address other cross-cutting issues.

The projects will benefit, to varying extents, households, communities as well as commercial and industrial sectors in rural and urban areas. The potential investors in the projects are the private sector, government and Swaziland's development partners. It is estimated that out of the total investment of US\$2.71 billion (E41.25 billion) required for the projects, there is great potential for the private sector to contribute US\$2.02 billion (75%), whilst the government contributes US\$548.10 million (20%) and development partners assist with US\$138.86 (5%), as presented in Figure 4.1 and Tables 4.1 and 4.2.

4.2 Brief description of prioritized projects

The 12 prioritized projects are summarized under six broad energy interventions to address the objectives of Sustainable Energy for All (SE4ALL) in Swaziland:

- Expand generation capacity from conventional energy sources;
- Increase access to modern energy for cooking;
- Promote productive uses of energy;
- Increase renewable energy in national energy mix;
- Increase energy efficiency; and
- Cross-cutting Issues.

Table 4.1: Prioritized investment opportunities in Swaziland under SE4ALL

Project no.	1	2	3	4	5	6	7	8	9	10	11	12	
Project title	Expand generation capacity from conventional energy sources		Increase Access to Modern Energy for Cooking		Training Programs to Promote Productive Use of Energy	Increase RE in National Energy Mix		Increase Energy Efficiency		Cross-cutting Issues			
	Lubhuku (Coal) Thermal Power Plant	Ngwempisi Hydro	LPG	Improved Cookstoves		Expand generation capacity from RE	Develop RE Policy & Database	Labelling & Certification of Appliances	Demonstration of EE Benefits / Incentives for EE	Develop Standards for Appliances	Create Awareness on RE & EE	Surveys, Gender Mainstreaming etc.	
Investment budget in US\$ million	973.80	352.32	0.9	6.4	0.7	1355.87	0.75	0.7	5.4	3.0	6.0	6.5	
Potential financing, %	Gov't	20	20	10	10	70	20	70	60	20	70	20	80
	Private sector	75	75	80	80		75			70		70	
	Dev't Partners	5	5	10	10	30	5	30	40	10	30	10	20
Focus	EA	X	X	X	X								
	RE						X						
	EE							X	X				
	CC									X	X	X	X
Community involvement	High			X	X	X			X		X	X	X
	Medium												
	Low	X	X					X	X	X			
Geographical location	National	X	X	X	X			X	X	X	X	X	X
	Regional												
	Town/Area Specified					X							
Concentrated in	Urban												
	Rural			X	X	X							
	Urban/Rural	X	X					X	X	X	X	X	X
Beneficiaries	Household	X	X	X	X			X	X	X	X	X	X
	Community	X	X		X	X		X	X	X	X	X	X
	Commerce	X	X	X		X		X	X	X	X	X	X
	Industry	X	X			X		X	X	X	X	X	X
Indicators	136.5 MW installed by 2018	300MW installed by 2018	70% Access to LPG by 2020	60% rural households use improved cookstoves by 2020	500 persons and 200 SMEs trained in PUE by 2020		RE Policy and database established	Labelling & certification of 4 appliances implemented by 2018	Demonstration of EE benefits / incentives for EE implemented by 2017	Standards of 4 appliances developed and enforced by 2020	Awareness creation on RE & EE initiated by 2017 and sustained	Annual energy surveys and gender-mainstreaming initiated by 2017 and sustained	

Table 4.2: Summary of prioritized investment opportunities in Swaziland under SE4ALL

Project no.	1	2	3	4	5	6	6	8	9	10	11	12	
Short title	Expand generation capacity from conventional energy sources		Increase Access to Modern Energy for Cooking		Training Programmes to Promote Productive Use of Energy	Increasing RE in National Energy Mix		Increase Energy Efficiency		Cross-cutting Issues			
	Lubhuku Thermal Power Plant	Ngwempisi Hydro	LPG	Improved Cookstoves		Expand generation capacity from renewable energy	Develop RE Policy & Database	Labelling & Certification of Appliances	Demonstration of EE Benefits / Incentives for EE	Develop Standards for Appliances	Create Awareness on RE & EE	Surveys, Gender Mainstreaming etc.	
Investment budget in US\$ million	973.80	352.32	0.90	6.35	0.65	1355.87	0.75	0.70	5.40	3.00	6.00	6.50	
Potential financing, US\$ million	Gov't	194.76	70.46	0.09	0.64	0.46	271.17	0.53	0.42	1.08	2.10	1.20	5.20
	Private sector	730.35	264.24	0.72	5.08	0.00	1016.90	0.00	0.00	3.78	0.00	4.20	0.00
	Dev't Partners	48.69	17.62	0.09	0.64	0.20	67.79	0.23	0.28	0.54	0.90	0.60	1.30
Total	973.80	352.32	0.90	6.35	0.65	1355.87	0.75	0.70	5.40	3.00	6.00	6.50	
Potential financing, %	Gov't	20	20	10	10	70	20	70	60	20	70	20	80
	Private sector	75	75	80	80		75			70		70	
	Dev't Partners	5	5	10	10	30	5	30	40	10	30	10	20

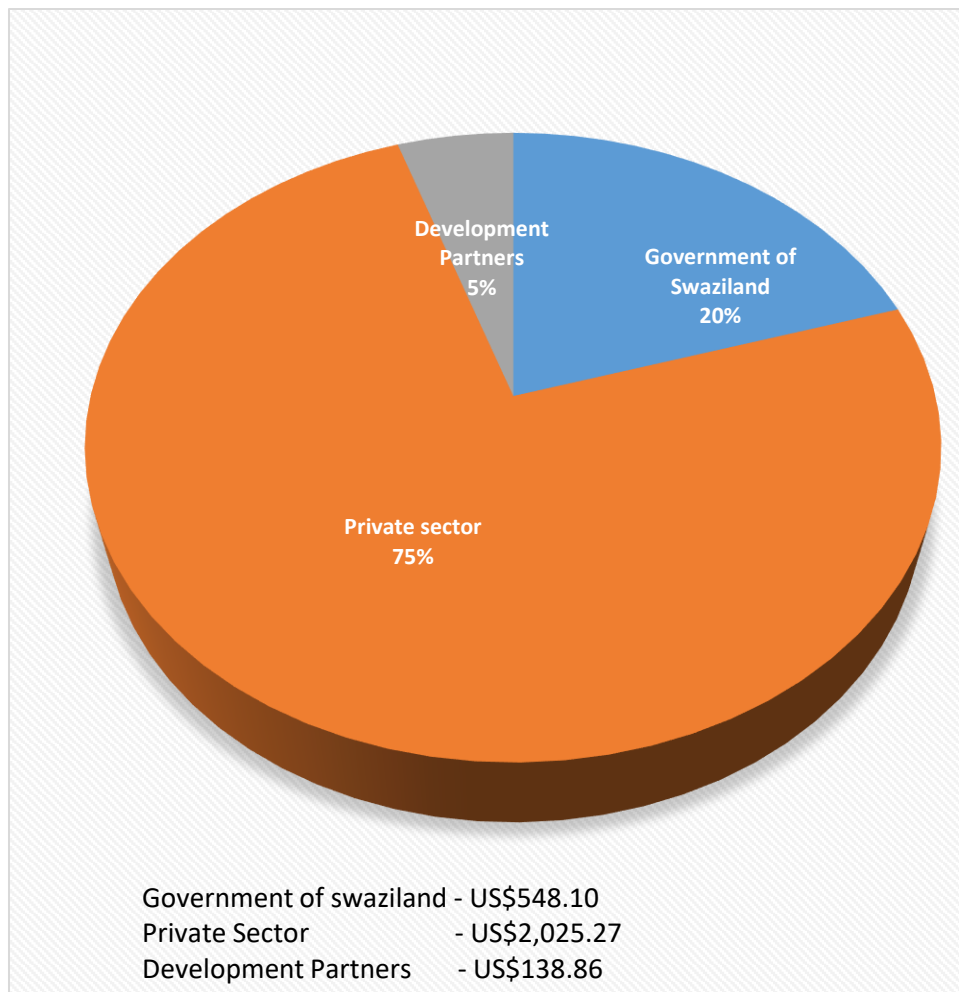


Figure 4.1: Potential investors for the Swaziland SE4ALL High Priority Projects

4.2.1 Expand generation capacity from conventional energy sources

The expansion of generation capacity from conventional energy sources involves the installation and operation of the 300 MW Lubhuku (Coal) Thermal Power Plant (with investment of US\$973.80) and 120 MW Ngwempisi Hydro Power Plant (US\$352.32). The total investment required is US\$1,326.12.

4.2.2 Increase access to modern energy for cooking

The key projects to increase access to modern energy for cooking in Swaziland are: i) Promotion of LPG (US\$900,000) and ii) Promotion of improved cookstoves (US\$6.35 million). The key activities under the Promotion of LPG include: a) Development and implementation of regulation structure and mechanism for LPG market chain; and b) Development and implementation of incentives to encourage private LPG retail/service companies to build up distribution network and retail outlets.

The key activities under the Promotion of Improved Cookstoves include: i) Development and implementation of domestic policy and legislation for promotion and development of improved

cookstoves; and ii) installation of advanced biomass cookstoves for cooking in public institutions, hotels and restaurants - 50 units/annum.

4.2.3 Promotion of productive use of energy

Activities to promote productive uses of energy will cost US\$650,000, and they include: i) Training programmes to build capacity for energy project feasibility studies and implementation; and ii) Technical training programmes for small and medium-scale enterprises (SMEs) to encourage the productive uses of energy.

4.2.4 Increase renewable energy in national energy mix

This intervention involves projects: i) to expand generation capacity from renewable energy (US\$1,355.87 million); and ii) to develop renewable energy and database (US\$750,000). The renewable energy power plants consist of: a) 3 small hydropower plants (6.85 MW); b) two solar PV power plants (26 MW); and c) four biomass power plants using sugar cane residue (bagasse) and/or wood chips (150 MW). When all are implemented, these renewable energy plants will add 182.85 MW of renewable energy to the power generation of Swaziland, and constitute about 26% of the expected power generation of Swaziland (695.40 MW) by 2030, if the other conventional power generation projects are implemented as well.

4.2.5 Increase energy efficiency

The intervention to increase energy efficiency in Swaziland will cost US\$6.1 million, and consists of projects on: i) Labelling and certification of appliances; ii) Demonstration of energy efficiency benefits, and implementation of incentives to encourage energy efficiency; iii) Development of standards for appliances. Specific activities include: a) Distribution of efficient lamps to selected communities – 500,000 CFLs per year for 3 years; and b) Facilitating the installation of efficient lighting in all new social housing projects of government.

4.2.6 Cross-cutting issues

Interventions to address cross-cutting issues will cost US\$15.5 million, and they include: i) Awareness creation on the benefits of renewable energy and energy efficiency; and ii) Annual energy access and consumer research surveys, and gender mainstreaming.

5. CONCLUSIONS

The Kingdom of Swaziland has one of the friendliest investment climates in Africa, as reflected in the successive Doing Business report of the World Bank. The energy sector present good investment opportunities and the government is very keen to welcome potential investors.

The presented Investment Prospectus should be seen as a living/rolling document within 5-year timeframe (2017-2021). The Energy Department of the Ministry of Natural Resources and Energy is committed to put together a team that will guide and supervise further the development of the identified and selected High Priority Projects into viable and bankable proposals.

The Investment Prospectus reflects the needs and constraints of the country. All the projects ideas and proposals are proposed by Swaziland-based institutions and groups through comprehensive consultations.

The Government of Swaziland, recognizes the importance of program champions in driving successful programs such as the Swaziland SE4ALL Investment Prospectus. The Government will select a program champion to drive the attraction of investments and implementation of the SE4ALL Investment Prospectus. The person will be someone with credibility needs to be able to interact convincingly with senior government officials, effectively explain and defend the SE4ALL Investment Prospectus in meetings with stakeholders, deal with donors, select and manage consultants, communicate with the private sector, and manage a complicated procurement and contracting process. The person will also be familiar with (and familiar to) senior officials, as well as someone with enough experience working with the private sector to be comfortable adopting a business-friendly approach.

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ANNEX 1. DETAILS OF PRIORITIZED INVESTMENT OPPORTUNITIES IN SWAZILAND UNDER SE4ALL

Table A1: Details of prioritized investment opportunities in Swaziland under SE4ALL

Prioritized Interventions	Prioritized Acceleration Solution	Key Activities	Total Cost, US\$
Increasing Local Electricity Generation Capacity	EA 1: Expand generation capacity from conventional energy sources	Implement the following generation projects:	
		Lubhuku Thermal Power Plant	973,800,000.00
		Ngwempisi Hydro	352,320,000.00
		Sub-total	1,326,120,000
Access to Modern Energy for Cooking – LPG	LPG 1. Develop and implement regulation structure and mechanism for LPG market chain	Conduct consultations with stakeholders in LPG market chain to develop and implement regulation structure and mechanism for LPG market chain	300,000
	LPG 2. Develop LPG Safety Association	Facilitate the formation and operation of LPG Safety Association	100,000
	LPG 3. Offer incentives to encourage private LPG retail/service companies to build up distribution network and retail outlets	Develop and implement incentives to encourage private LPG retail/service companies to build up distribution network and retail outlets e.g. import duties and taxes reduction	200,000
	LPG 4. Create LPG distribution concessions for existing LPG retailers/marketing companies or new actors	Facilitate the creation of LPG distribution concessions for existing LPG retailers/marketing companies or new actors	100,000
	LPG 5. Establish favourable and transparent product pricing regime for LPG	Conduct stakeholder consultations to develop and implement favourable and transparent product pricing regime for LPG	200,000
		Sub-total	900,000

Prioritized Interventions	Prioritized Acceleration Solution	Key Activities	Total Cost, US\$
Access to Modern Energy for Cooking – Improved Cookstoves	ICS 1. Institute domestic policy for improved cookstoves and advance legislation for promotion and development of improved cookstoves	Conduct stakeholder consultations to develop and implement domestic policy and legislation for promotion and development of improved cookstoves	200,000
	ICS 2. Institute incentives to promote the improved cookstoves subsector	Develop and implement incentives to promote the improved cookstoves subsector – e.g. reduce import duties and taxes reduction	150,000
	ICS 3. Testing and certification facility for improved stoves	Establish Improved Cookstove Test Laboratory with appropriate equipment and skilled personnel	1,000,000
	ICS 4. Consumer surveys and regional energy needs assessment on cookstoves	Undertake consumer surveys and regional energy needs assessment on cookstoves to map socio-cultural variations and priorities (once every three years)	600,000
	ICS 5. Demonstrate benefits of improved cookstoves	Introduce advanced biomass cookstoves for cooking in public institutions, hotels and restaurants - 50 units/annum	500,000
	ICS 6. Participation of financial sector in the design and implementation of cookstove programmes	Fully engage with financial institutions to provide medium to long-term finance for capital investments in production and business growth, and soft loans to end-users	100,000
	ICS 7. Funding for research and development, demonstrations, M&E, and impact analysis on cookstoves	Set up dedicated fund for research and development, demonstrations, M&E, and impact analysis on cookstoves	3,000,000
	ICS 8. Promote knowledge and experience sharing among stakeholders	Organize annual stakeholder workshops and conferences on improved cookstoves (8 events)	800,000
		Sub-Total	6,350,000
Promotion of Productive Use of Energy (PUE)	PUE 1. Train officials of relevant energy institutions on capacity for project feasibility studies and implementation	Organize training programmes for officials of energy institutions on capacity for project feasibility studies and implementation	250,000
	PUE 2. Provide technical training and business development to meet the needs of target MSMEs involved in PUE programmes	Organize technical training programmes for PUE SMEs	250,000
	PUE 3. Include relevant energy access and utilization data requirements in national living standards surveys and population census	Organize training programmes for officials of Central Statistical Office on gathering data on energy access and utilization	150,000
		Sub-total	650,000

Prioritized Interventions	Prioritized Acceleration Solution	Key Activities	Total Cost, US\$
Increasing the Contribution Of Renewable Energy in the National Energy Mix	RE 1. Expand generation capacity from renewable energy sources	Daroway Hydro Power	14,680,000
		Lower Maguga Hydro Electric Scheme (LMHES)	2,936,000
		Hydro Power Generation at Lubovane Dam, Siphofaneni	2,495,600
		KaLanga PV (WunderSight Project)	87,843,000
		Lavumisa Solar	20,915,000
		RSSC Biomass Generation	818,000,000
		Montigny Biomass Plant (Usutu)	245,400,000
		Symbion Biomass Plant (Havelock)	81,800,000
		Clean Energy Africa Biomass (Woodfuel) Plant, Ngodwane	81,800,000
		RE 2. Develop appropriate policy instruments to promote renewable energy	Conduct stakeholder consultations to develop the policy instruments to promote the following: i) Feed-in-tariff for biomass and hydro power; ii) Tendering for PV and wind; iii) Net-metering for roof top based PV; and iv) Government subsidies for rural electrification with PV
	RE 3. Reliable data on renewable energy resources	Intensify and expand gathering of reliable disaggregated data on renewable energy resources	500,000
		Sub-total	1,356,619,600
Increasing Energy Efficiency	EE 1. Labelling and certification for efficient household appliances	1. Conduct stakeholder consultations to develop, adopt and implement policy and regulatory framework for energy efficiency	400,000
		2. Conduct stakeholder consultations to design, adopt and implement mandatory labelling and certification for efficient lamps and refrigerators	300,000
	EE 2. Demonstrate the benefits of efficient use of energy	1. Implement free distribution of efficient lamps or at subsidized cost to carefully selected communities – 500,000 CFLs per year for 3 years	5,000,000
		2. Promote installation of efficient lighting in all new social housing projects of government	200,000
	EE 3. Incentives to encourage efficient use of energy	Facilitate development of financing schemes to cover the upfront cost of lighting products	200,000
			Sub-total

Prioritized Interventions	Prioritized Acceleration Solution	Key Activities	Total Cost, US\$
Cross-Cutting Issues	CCI 1. Gaps in energy data and research (including consumer research) and lack of funding for regular annual surveys to update energy data	Conduct Annual Energy Access and Consumer Research Surveys	3,000,000
	CCI 2. Lack of funding for sustained public education and awareness creation	Prepare and implement Annual Programmes for Public Education and Awareness Creation on Energy Access, Renewable Energy and Energy Efficiency	6,000,000
	CCI 3. Lack of Standards and weak regulatory regimes in energy sector	Develop Standards for energy end-use devices and strengthen regulations in energy sector	3,000,000
	CCI 4. Low level of mainstreaming gender into policies and programmes	Mainstream Gender into policies and programmes and evaluate effectiveness	2,000,000
	CCI 5. Weak integration of Climate Change into programmes and projects	Integrate Climate Change into programmes and projects and evaluate effectiveness	1,000,000
	CCI 6.1 Establish and implement effective national governance and monitoring mechanism for SE4ALL	Organize regular inter-Ministerial and Inter-Agency Meetings to review SE4ALL policies, programmes and projects	500,000
		Sub-total	15,500,000
		GRAND TOTAL	US\$2,712,239,600
			E40,683,594,000*

*E15.00=US\$1.00 (July, 2016)

ANNEX 2: SWAZILAND ELECTRICITY COMPANY (SEC) TARIFF STRUCTURE SCHEDULE 2016/17

Table A2.1: Non-Time-of-Use (TOU) Tariffs

Type	Non-TOU Tariffs	Facility Charge		Energy Charge		Demand Charge		Access Charge	
		E/month	US\$/month	E/kWh	US\$/kWh	E/kVA	US\$/kVA	E/kVA	US\$/Kva
S10	Life Line			1.1652	0.08				
S1	Domestic			1.255	0.08				
S2	General Purpose	182.5371	12.17	1.7402	0.12				
S3	Small Commercial - Prepayment	182.5371	12.17	1.7402	0.12				
S3	Small Commercial - Credit Meter	365.0742	24.34	1.7402	0.12				
K4	Small Holder Irrigation	1,617.44	107.83	0.6602	0.04	110.8638	7.39	43.6504	2.91
K5	Large Commercial and Industrial	1,902.87	126.86	0.7768	0.05	130.4246	8.69	51.3135	3.42
K6	Large Irrigation	1,902.87	126.86	0.7768	0.05	130.4246	8.69	51.3135	3.42

Table A2.2: Time-of-Use (TOU) Tariffs

Time-of-use (TOU)* Tariff	Facility Charge US\$/mon.	Demand Charge US\$/kVA	Access Charge US\$/kVA	Energy - Low Demand - Peak c/kWh	Energy - Low Demand - Standard c/kWh	Energy - Low Demand - Off-Peak c/kWh	Energy - High Demand - Peak c/kWh	Energy - High Demand - Standard c/kWh	Energy - High Demand - Off-Peak c/kWh
TOU at MV at HV network	294.26	7.90	3.41	0.08	0.06	0.05	0.23	0.07	0.05
TOU at MV	141.62	8.28	3.57	0.08	0.06	0.05	0.24	0.07	0.05
TOU at LV	106.53	8.69	3.42	0.08	0.06	0.05	0.24	0.07	0.05
TOU small irrigation <100 Kva	90.55	7.39	3.18	0.07	0.05	0.04	0.20	0.06	0.04

Source: Swaziland Electricity Company, 2016

***Table A2.3: High Season/Demand Time of Use (TOU) Periods in Swaziland**

Day	Peak	Standard	Off-Peak
Monday to Friday	0600 – 0900 1700 – 1900	0900 – 1700 1900 – 2200	2200 – 0600
Saturday	n/a	0700 – 1200 1800 – 2000	1200 – 1800 2000 – 0700
Sunday	n/a	n/a	All day

Source: Swaziland Electricity Company, 2016