THE KINGDOM OF LESOTHO

MINISTRY OF ENERGY AND METEOROLOGY

Department of Energy

National Sustainable Energy Strategy

October, 2017

LIST OF ABBREVIATIONS

ACE	African Clean Energy
ATS	Appropriate Technologies Services
CO_2	Carbon Dioxide
COP	Conference of Parties
CSP	Concentrated Solar Power
DoE	Department of Energy
ECCD	Early Childhood Care Development
EDM	Electricidade de Moçambique
EIA	Environment Impact Assessment
EU	European Union
FOCAC	Forum on China-Africa Cooperation
FREA	Facility for Rural Energy Action
GDP	Gross Domestic Product
GHG	Green House Gases
HIV/AIDs	Human Immunodeficiency Virus & Acquired Immunodeficiency Syndrome
IAEA	International Atomic Energy Agency
ICM	Integrated Catchment Management
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contributions
LEC	Lesotho Electricity Company
LEDs	Light Emitting Diode
LEIP	Low Emissions Investment Plan
LESOC	Lesotho State Oil Company
LEWA	Lesotho Electricity and Water Authority
LHDA	Lesotho Highlands Development Authority
LMS	Lesotho Meteorological Services
LPG	Liquefied Petroleum Gas
LREBRE	Lesotho Renewable Energy Based Rural Electrification
M&E	Monitoring and Evaluation
NCDC	National Curriculum Development Centre
NGOs	Non-Governmental Organizations
NREF	National Rural Electrification Fund
NSDP	National Strategic Development Plan
NUL	National University of Lesotho
PPP	Public Private Partnership Programme
PV	Photovoltaic
RESCOs	Rural Energy Service Companies
REU	Rural Electrification Unit
SACU	Southern African Customs Union
SADC	Southern African Development Cooperation
SAFEGE	Société Anonyme Française d'Etude de Gestion et d'Entreprises
SCBI	Strategic Capacity Building Initiative
SE4ALL	Sustainable Energy for All

SES	Sustainable Energy Strategy
SPPA	Standardized Power Purchase Agreement
SREP	Scaling Up Renewable Energy Programme
SOLTRAIN	Southern Africa Solar Thermal Training
SWH	Solar Water Heating
TAF	Technical Assistance Facility
TB	Tuberculosis
TED	Technologies for Economic Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention for Climate Change
UNIDO	United Nations Industrial Development Organization
UAF	Universal Access Fund

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EXECUTIVE SUMMARY

While electricity in particular and energy in general remain vital to social economic development of Lesotho, unfortunately the majority of Basotho still depend on Biomass as their main supply of energy especially for cooking and space heating. The entire power generation in the country (72 MW) comes from only one hydro source, which renders the country extremely insecure in case the Muela power plant failed for any reason. As the power demand exceeds this generation capacity, the rest of the power used in the country which counts for about 50% of the total capacity used today in the country is imported from South Africa, certainly affecting the

foreign currency reserves for the country. The current power demand has already exceeded the total supply and therefore the Government needs to come up with extra generation. But also, to increase access to the population, which is critical for priming the social economic development through facilitating the productive uses across the country, grid extension shall be essential with other economic power supply solutions for the consumers that are far away from the grid. Other sector challenges include inadequate access to finance by the consumers, Lack of energy efficiency strategy, inadequate capacity to install and maintain renewable technologies.

Despite all these challenges, Lesotho is blessed with clean energy resources including enormous wind potential, hydro and solar which if well harnessed could easily reverse this troubling situation.

Cognizant of this potential, the Government decided to undertake a systematic approach to explore and exploit these potentials. An energy policy (2015-2025) was developed and launched in 2015 as an essential tool that would guide all other initiatives as a path for Lesotho to achieve an access rate of 50% by 2020 as called for by the National Vision 2020 which would in turn drive the economy to the benefit and wellbeing of all Basotho. To effectively implement this policy, a strategy is required upon which clear actions shall be pronounced with indicative budgetary implications all meant to enable timely policy implementation success.

In this respect, the strategy suggests to promote renewable energy sources and energy efficiency among other issues being addressed by the policy. Promotion of cleaner forms of energy and technologies will attract incentives. The goal is that the share of cleaner fuels in the energy supply mix increases while the share of non-sustainable forms of energy accordingly reduces. This proposed path of energy sector development is consistent with the three major objectives of SE4All that advocates for universal access to modern energy, increased energy efficiency and doubling the renewable energy sources in the total energy mix.

To achieve this, the strategy calls for review of institutional mandates of energy institutions. This is expected to provide a platform for participation of different stakeholders in the implementation of the policy.

To inform the formulation of the strategy, a country wide consultation process has been undertaken in order to understand and take into account the views of the population in order to have an inclusive ownership of the policy and its strategy. The table below provides a summary of the key aspects the strategy shall be anchored on, and based on that the action plan shall be drawn.

SUMMARY OF STRATEGIES AND PROPOSALS	
1. SECURITY OF ENERGY SUPPLY	
Electricity Subsector	**Electricity Generation:** Increase installed capacity of about 300 **MW by 2022**. **Feasibility Studies:** Government is prioritising developing the feasibility of different generation sources to reduce the perceived delivery risks and lay ground for more private sector participation. **Transmission:** Construct, expand and maintain transmission infrastructure to improve supply of electricity countrywide
Petroleum Sub-sector	**Storage:** Increase petroleum storage capacity to achieve a minimum of 90 days fuel supply **Importation:** Secure petroleum imports through regional collaboration and cooperation

	Transportation: Explore alternative ways of transporting petroleum products into the country
Biomass and Bio-energy Subsector	**Production:** Increase availability of biomass resources through collaboration with other Ministries and non-state actors
2. INCREASING ENERGY ACCESS	
Electricity Subsector	**Connections:** Increase access to electricity through grid and off-grid solutions to ensure that **75% of households get access to electricity** through grid and off-grid solutions by 2022
Clean, modern and renewable energy sources and technologies	Ensure universal access through increased supply and distribution of clean, modern and renewable energy sources and technologies, 50% of LPG use, and 70% of rural clinics using SWH by 2022
Biomass, Biogas, and Biofuels Subsector	Promote sustainable use and conservation of biomass resources (installation of at least 1000 bio-digesters by 2022) Strengthen research in biofuels and associated technologies
3. ENERGY EFFICIENCY AND DEMAND SIDE MANAGEMENT	
Electricity systems improvement and network rehabilitation	Reduce technical losses from 10% to 5% by 2022 *(Source: WB report, 2009: Monitoring Performance of Electric utilities)*
Energy efficient appliances	Increase distribution of energy efficient cook stoves to achieve atleast 70% household use by 2022
Demand side management	Promote demand side management measures to lower electricity consumption
Renewable Energy technologies	Roll-out solar water heating and solar street lighting programmes
4. LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORKS	
Institutional Framework	Strengthen institutional arrangement and establish clear mandates Strengthen energy sector coordination
Regulatory Framework	Develop, review and enforce legal and regulatory framework
5. PROMOTE RESEARCH AND DEVELOPMENT, INNOVATION AND TECHNOLOGY TRANSFER	
Research and development	Encourage and support R&D undertakings in academic and research institutions including technical and vocational institutions
Database Management and data analysis	Maintain an up-to date energy data and analysis for planning and policy formulation
Innovation and technology transfer	Promotion of innovation and technology transfer through energy centres Promote technology exchange programmes regionally and internationally
6. PRIVATE SECTOR PARTICIPATION IN THE ENERGY SECTOR	
Renewable Energy	Encourage and support private sector participation in the renewable energy sector. (Capacity building and financing facilitation)
Petroleum Subsector	Increase participation of Basotho in the petroleum industry
7. CIVIL SOCIETY PARTICIPATION IN THE ENERGY SECTOR	
Advocacy	Engage and support civil society in promotion of energy information dissemination and outreach
Capacity building	Increase local capacity on energy resources development and promotion advocacy (Capacity building and financing facilitation)

8. YOUTH AND GENDER MAINSTREAMING	
Women, Youth and vulnerable groups	Ensure meaningful participation of women, youth and vulnerable groups in energy planning and decision making processes.
Business Development	Promote and support involvement of women and youth in energy related SMMEs
Capacity Building	Build capacity of women, youth and vulnerable groups in energy-related activities
9. RESPONSE TO ENVIRONMENT AND CLIMATE CHANGE	
Climate change	Mainstream climate change in all energy-related programmes and projects.
Environment	Promote greening of the economy and ensure adherence to social and environmental requirements
10. RESOURCE MOBILIZATION	
Energy Fund	Establish a consolidated energy fund to support energy development initiatives.
capacity-building	Create internal capacity (specialised unit) for resource mobilisation
Private sector participation	Create and enabling environment for private sector participation (IPPs, PPP, and other innovative financing models including bonds etc).
11. ENERGY MANAGEMENT INFORMATION SYSTEMS (EMIS)	
Information office	Institute capacity (dedicated unit) to collect, process, document and disseminate energy information.
12. REGIONAL INTEGRATION AND INTERNATIONAL COOPERATION	
Regional	Participate in all regional initiatives of mutual interest (SADC, IOC, SAPP, RERA, SACREEE, AUC agenda 2063, etc)
International	Aligning with international agenda (SDGs, SE4ALL, IRENA, IAEA, IEA, UNFCCC, GEF, EU, USAID, UN bodies, Multilateral development banks, etc)

Table 1: Summary of key Strategic aspects and solutions

CHAPTER 1: INTRODUCTION

The Kingdom of Lesotho has embarked on achieving increased access to safe, reliable and affordable energy as part of the contribution towards achieving the ambitious levels of growth defined under the Government Vision 2020 as well as NSDP. It remains a fact that there is a strong correlation between a country's energy usage and the level of development. The energy sector in Lesotho consists of three main components: Electricity, Biomass and Petroleum, with each playing a key role in the country's social economic development.

The primary source of energy in Lesotho continues to be biomass, principally used in cooking and heating. The most basic forms of biomass are firewood, shrubs and charcoal. Firewood is associated with environmental, social and health problems, stemming from deforestation and the emissions from wood and charcoal burning respectively. To address the social and health problems emanating from use of biomass, the government through the Ministry of Energy and Climate Change is promoting the use of alternative fuels such as biogas from animal and human waste. This will free up the time of women and children currently spent collecting firewood, giving them enough time to study and undertake more productive commercial activities.

Electricity is an essential driver of modern technologies and a prime mover of socio-economic development. Use of electricity is required for both low consumption devices such as lights and mobile phones and large users such as industry which will enable industrial processing activities, value addition, driving exports and job creation. Electricity access in the country could be through on-grid connections to households and businesses and off-grid solutions especially to rural areas that are located far from the national grid.

Current priority is to extend the network to allow heavy users of electricity across the country that drive the economy to connect to the grid, while for lighter users of electricity, grid connections are unlikely to make economic sense in the short term and as such, off-grid solutions such as Solar PV and Micro-hydro or even wind will be preferred. Overall, the government intends to support up to 50% of the population with access to electricity by 2020.

To keep pace with the increasing demand for electricity, but also reduce the risks of power import dependence, the government will ensure increased electricity generation capacity above the current capacity of around 72 MW. Diversification of power generation sources going beyond the current (only) hydro, solar and wind shall be significantly promoted.

This strategy document provides a detailed roadmap of investments which will allow meeting of the energy requirement as projected. Around 120 MW of additional generation is likely to come from Hydro, whilst targeting the development of around 50 MW of wind and about 60 MW of solar. Benefiting from the regional partnership on power trade, part of off-grid solutions in some identified districts shall be provided through importing power from South Africa, especially to the districts that are close to the

powered neighbourhood in South Africa. That way, all shall be needed is installation of networks on to those beneficiary districts.

Promotion of biomass and biogas shall remain an important undertaking taking into account the enormous requirement of both for cooking and heating especially during the cold season of the year. While promotion and dissemination of efficient cook-stoves shall be a main focus on Biomass efforts, Biogas technology promotion and dissemination shall be focused on.

The other component of Lesotho's energy mix is petroleum. Petroleum products are essential for industrial use, lighting, and transport. Over the course of economic development, maintaining a stable supply of low-cost petroleum products will become more and more important. Strategic storage shall also be key in order to maintain minimum stock for the country but also in absorption of price shocks and fluctuations that occur from time to time with petroleum products. Modern energy sources including Kerosene and Liquid Petroleum Gas shall be encouraged for lighting, cooking and heating respectively.

CHAPTER 2: COUNTRY OVERVIEW

Lesotho is located in the south-eastern part of southern Africa and is completely surrounded by South Africa. It is located between latitudes 28°S and 31°S and longitudes 27°E and 30°E in the interior of Southern Africa. The country is dominated by topography higher than 1000 metres above sea level (masl). It is situated at the highest part of the Drakensberg escarpment with altitude ranging from 1,400 m to 3,482 masl (Chakela, 1997). The country has a total area of 30,355 km^2 and is divided into four agro-ecological zones across the ten districts, the Lowlands, Foothills, Mountains and Senqu River Valley **(figure 1).** The districts are further divided into 80 constituencies, each represented by a single seat in the National Assembly.

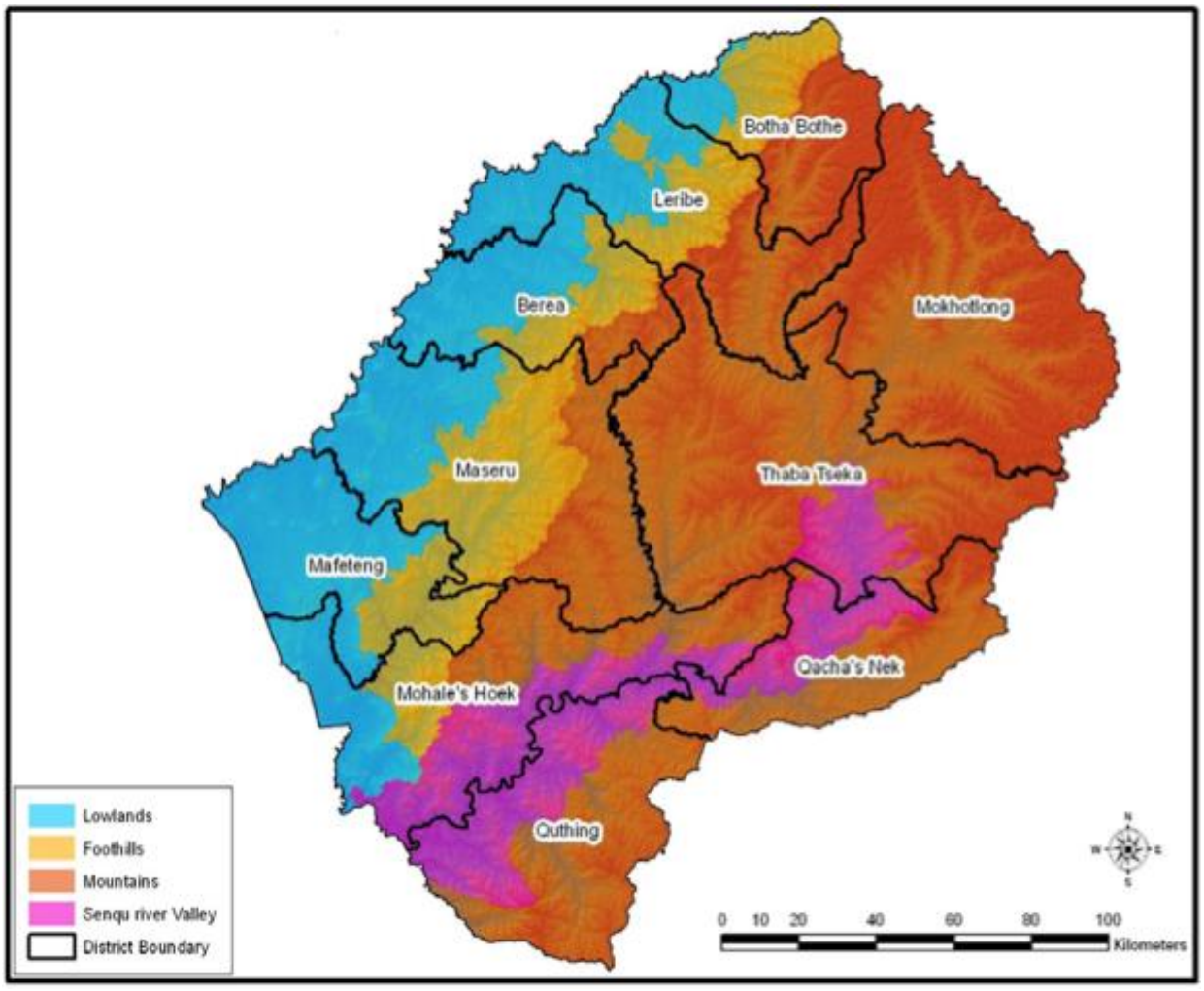
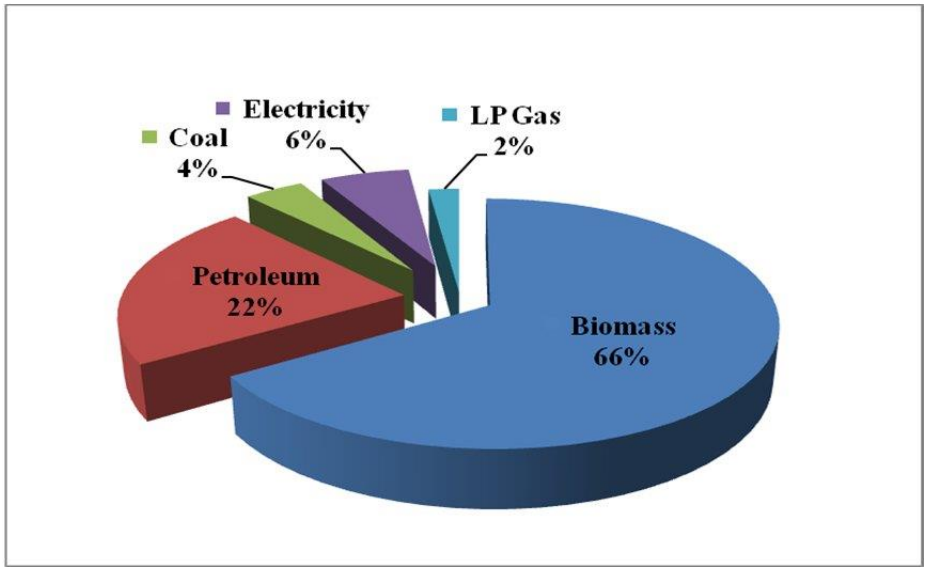


Figure 1: Map of Lesotho

CHAPTER 3: ENERGY SECTOR OVERVIEW

The country's primary energy base consists of hydroelectricity, biomass, and petroleum products. The chart below shows the Lesotho Energy mix. Most households generally use a combination of energy sources for cooking that can be categorised as; traditional (such as dung, agricultural residues and fuel wood), intermediate (such as coal and kerosene) or modern (such as liquefied petroleum gas (LPG) and electricity).

Lesotho's energy balance is dominated by biomass energy, which contributes 66% to the energy mix. The remaining 34% is made up of petroleum products, hydroelectricity, coal and LPG in order of decreasing magnitude (Figure 2).



Source: B.M Taele et al[1] : Rapid Assessment and Gap Analysis for

Figure 2:: Lesotho's Energy Mix

All the electricity generated locally is hydro based and Muela the main operating Plant has an installed capacity of 72MW. There are also four mini-hydro plants with a combined installed capacity of 3.25MW, Semonkong mini hydro plant is in operation while the Mantsonyane has been under rehabilitation. The other two are not operating due to poor maintenance, siltation and flooding. The total installed capacity is less than the maximum demand of 153MW mostly in winter (2016)

CHAPTER 4: SUSTAINABLE ENERGY STRATEGY

4.1 RATIONALE AND SCOPE

4.1.1 RATIONALE

The Government of Lesotho has decided to take measures to embark on developing the sustainable energy strategy to achieve, among other others, three principal outcomes which are interlinked;

- to improve energy security;
- to encourage and foster economic development, and,
- to contribute to the protection of climate and the wider environment from impacts of the use of destructive energy sources

To this effect, the developed Sustainable Energy Strategy lays out the implementation roadmap of the Energy Policy 2015-2025. It is a 5 - year rolling plan and shall address the implementation roadmap which comprise energy sector proposed solutions to be implemented in the near-term (2018-2020), and the medium-term (2018-2022) time horizons.

i. Energy demand

In Lesotho, energy is utilized by rural households, urban households, government buildings and institutions, commerce, industry, agriculture and transport. Energy demand is highly dependent on factors related to the accessibility, affordability and, reliability of energy resources.

The dominant energy resource used in the rural areas of Lesotho is biomass, which, in its various forms, is used for cooking and space heating. Almost 90 per cent of energy consumption in the rural areas is sourced from indigenous biomass fuels consisting of shrubs, firewood, crop residues and cow-dung. Paraffin is used for cooking, heating and lighting. Other fuels such as LPG and coal play a relatively minor role in rural areas for cooking and space heating. Electricity access is generally very low in rural areas. Biogas is another emerging source of energy that is getting used for especially cooking, but it is still at its infancy development level.
Urban residents depend on commercial energy resources and firewood for cooking, space heating, water heating and lighting. Predominant fuels are LPG, paraffin, coal, firewood, and electricity.

Government buildings and institutions mainly use electricity and coal as energy source for their various activities and ninety percent of the consumption for these two fuels is for space heating and lighting. Generally, electricity is used for space heating in urban areas and outlying towns, and rural institutions use coal where grid electricity is unavailable.

Commercial sector energy consumption is dominated by electricity (75 percent) for lighting and space heating. Other forms of energy such as coal, diesel, firewood and LPG constitute only 25 percent. Most industries use electricity for lighting and coal or electricity for space heating and process heat.

Agriculture in Lesotho is mainly at the subsistence level and there is minimal commercial farming. Most energy is provided through human labour or animal power, though tractors are used to a limited extent (for ploughing and milling). While the energy demands of agriculture are quite small in terms of commercial energy, the sector is important in terms of its contribution to biomass fuels (wood, crop residues and animal dung) as well as the possibilities for income-generating activities that require energy as an input.

Specifically, for Electricity subsector, according to Lesotho Electricity Company 2016 data, the largest share of electricity is consumed by the industrial sector with 35% of electricity followed by domestic with 33% and commercial sector with 19%. As a developing country, Lesotho's industry is expected to grow and the demand for electricity will also grow. Lesotho National Development Cooperation (LNDC) projections predict that there will be large demand of energy as the country develops.

Looking at the consumption of electricity, the average per capita consumption of electricity in Lesotho is 300kWh, less than half the Sub-Saharan African average of 488 kWh, but has been growing since 2009 because of new household connections. Electricity demand peaks during the winter months of June through to August, when there is high demand for heating, and is lowest in the summer.

ii. Energy contribution to economic transformation and rapid growth

Energy undergirds civilization and has powered sweeping economic changes that have transformed the world over the last two and a half centuries. However, just as the economy has changed, so has the energy mix that fuels it. The development of the modern world has been a story of evolving new uses for energy and constantly growing energy demand. New forms of energy and new technology to harness that energy have been developed over time, shifting the energy balance and expanding the menu of energy sources (World Economic Forum, 2013)

Lesotho's economy like any other economy derives its growth significantly from energy resources. All the sectors of the economy from transport, manufacturing, construction, and mining among others all require energy supplied adequately and cost effectively if the investors in these sectors are to reap economic benefits. At a micro level, energy enables people to cook, heat, transport, and entertain, all these being the dominant areas that employ most of the people of Lesotho. Electricity to power the TVs, fuel for our cars, or heat for our homes, is supplied by the energy sector. It is therefore apparent that economic growth is inextricably linked to energy. As energy is tied to our economy, our required economic growth is dependent upon equitable access to energy, sufficient supply at affordable rates.

Energy contribution to economic transformation and rapid growth

Going by economic theory, for every 10% increase in energy supply, 7% GDP growth shall be registered

Community Priority Need	Energy contribution and effects
❖ **Boost on business Development** ❖ Income generation ❖ Employment creation	❖ The cost of power contributes a significant portion to the overall cost of production in the country. The sector strategy looks to ensure affordable and sufficient power supply by diversifying and promoting domestic sources of energy. This will boost local investments into large, small and medium Enterprises, creating employment opportunities and positively impacting on the state of all Basotho's welfare. ❖ People will be able to use electricity for income generation activities like putting up welding shops, hair salons, kiosks, grain milling centres, etc, across the country.
❖ **Agricultural Transformation**	❖ To reduce seasonal disruptions in agricultural productivity through reduced harvests, an elaborate irrigation program has been designed by Ministry of Agriculture. Irrigation systems require adequate power supply in form of electricity to pump the water to irrigated areas or adequate supply of affordable fuel to run diesel generators. ❖ The energy strategy will aim to ensure security of supply of both electricity and fuel to irrigation projects that promote agriculture transformation. ❖ It is expected that providing reliable power supply to rural and dry mountainous areas will make it possible for farmers to keep to their irrigation schedules, conserve water, save on pump maintenance costs and use labour more efficiently. These and other benefits will help drive agricultural production to new heights while improving the quality of life for agro based households.
Iii. Rural Development ❖ Improved social economic welfare ❖ Reduction of rural urban migration	❖ There are currently visible disparities between rural and urban areas in terms of access to electricity and income levels. Rural access to electricity stands at 6% percent compared to 38% for urban areas. The aim of the energy sector strategy under the NSDP objective is to increase electricity access from the current 34 percent (2012) to 75 percent through grid and off-grid connections respectively by 2022. The REU will focus on the rural areas and a great deal of rural households and business units are set to benefit from the Unit's initiatives. This effort will bridge the rural-urban disparity in access to electricity, thereby improving on businesses start-ups, enable long working hours and promote rural based employment. ❖ Rural electrification will support the initiatives to construct better schools, hospitals and clinics, roads and other social amenities and there will be no more need for rural dwellers moving to urban areas in search of better quality of life. Established social infrastructure and reduced Rural Urban Migration will ensure retention of productive labour force to rural areas, reverse to urban rural exodus and support rural development. ❖ Electronic devices such as radios and television are common media of communication to rural areas, thereby bridging the rural-urban knowledge gap and information asymmetry especially market related issues. All these quick mediums of communication require reliable power supply to avoid delayed information dissemination.
iv. Universal Primary Education ❖ Free basic education for all.	❖ Electricity availability at home and schools enables access to educational media and distance learning. ❖ Good quality lighting enables home-based study. ❖ Lighting in schools allows evening classes and study, and helps retain teachers, especially if their accommodation has electricity.

❖ Increases access to quality Early Childhood Care Development (ECCD).	❖ Availability of electricity services free children's and especially, girls' time from helping with survival activities such as fetching water and collecting firewood. ❖ Availability of power allows early computer literacy to young children
V. Basic Health services ❖ Improving access to quality essential health care and social welfare services. ❖ Strengthen health promotion and disease prevention.	❖ Electricity for refrigeration allows vaccination and medicine storage for prevention and treatment of diseases and infections ❖ Enables access to health education media through information communication technology. ❖ Cleaner energy technologies are expected to reduce energy-related (biomass) health problems/diseases.
vi. Water and Sanitation	❖ Improve the supply of clean potable water supply to rural areas. ❖ Electricity can be used to pump ground water locally and thereby reducing time spent collecting it
vii. Promotion of mining and mineral value addition	❖ Providing access to affordable, stable and sufficient power supply is a positive step towards efficient mining activities. The country is rich in Diamonds and efficient power supply may encourage mineral processing for value addition in exports but also for cost competitiveness. For this to happen, there is need for unhampered supply of cheap and adequate electricity.
viii. Boosting industrialization plans	❖ For Lesotho's economy to be transformed, there is need for a structural shift from traditional agriculture to industry and service sectors. Industries and factories will require sufficient energy solutions to generate desired output. ❖ The national energy strategy will ensure sufficient supply of electricity required in industries and factories and at economically affordable tariffs and this will be a formidable tool for economic transformation. ❖ The target for the next 5 years is to ensure 100% sufficient access to clean and affordable energy by industries and Medium and large enterprises that are engines of economic growth.
ix. Reduction on trade imbalance ❖ Developing a sufficient strategic reserve capacity for petroleum products.	❖ The petroleum strategy looks to improve petroleum strategic reserves capacity to avoid supply shocks that affect fuel prices. ❖ Oil products contribute significantly to Lesotho's import bill and an unplanned price fuel price hikes affect government planning and worsen the trade balance due to a spike in oil import bill.
x. Demand stimulation ▪ Affordable power tariffs	❖ Increased energy prices reduce demand by reducing use of energy services and motivating selection of higher conversion efficiency equipment. ❖ For example, the price per liter of petrol will affect transport and other costs of running machines, with a final price implied to the final consumers. ❖ This will affect demand especially for commodities with fairly elastic demand. The energy strategy looks to ensure affordable power supply that in a way will have a systemic price effect on the final commodities on the market and act as an indirect approach to demand stimulation since reduction in commodity prices is the same as increase in consumers' income. Higher effective demand is a stimulus to economic growth and transformation.
xi. Productivity and Youth Employment	❖ By the standard definition, a youth is anybody between the ages of 15 to 35. ❖ According to the available statistics (Lesotho Demographics profile 2016), the age group between 15-24 years constitute 19.56% and 25-54 years constitute 37,58% of the population of Lesotho, and this is a formidable tool to Lesotho's future economic prosperity. However, this group, especially the 15-24 years requires skills and

	expertise if they are to meet the labour market demands. Government has established Technical and Vocational Education Training colleges to accommodate these youths and equip them with hands-on skills into carpentry, welding, plumbing, building and construction as well other engineering activities, there is strong need for cheap and adequate energy resources if these activities are to bear meaningful results. ❖ In Lesotho, most of these youths are employed in Small and Medium Enterprises including electricity shops, photography, hair salons, plumbing works, construction, and others. These require sufficient uninterrupted power supply to run smoothly.
xii. Accountable Governance	❖ It is the responsibility of any pro people government to provide socio-economic necessities. ❖ Government will ensure transparent and competitive electricity market operations where participating players have equal opportunities. ❖ Government plans to ensure more local participation in the development of their own energy resources. This reflects a deliberate effort by government to make its citizens part of the nation state governance though direct or indirect ownership of their development process.
xiii. **Cross Cutting Issues** **a. Capacity Building**	❖ The current levels of human and institutional capacity are not sufficient to deliver on the sector commitments with ease. To implement energy sector projects on time, and scale up project delivery, some enabling institutional framework and skilled personnel is a pre-requisite. ❖ This energy sector strategy puts in place measures of improving energy sector organization and management and develops capacity building plan to cover current skills gaps for the sector. ▪ **Trainings and Knowledge transfer**-The capacity of energy sector staff will be enhanced through knowledge transfer from long term experts and through short training courses. There will also be recruitment of external expertise for major transactions in order to ensure that government is getting beneficial deals. ▪ **Strategic Capacity Building Initiative (SCBI**)-The ministry has hired both local and international sector counterparts sponsored by the European Union to boost the energy sector. Local counterparts will learn from their international counterparts and it's hoped that with the expiry of their (international counterparts) contracts, local expert's contracts will be able to move the sector to further desired levels.

b. Gender promotion and women economic empowerment	❖ The strategy will address the energy needs for vulnerable groups in the communities, boys in Lesotho herd animals in remote areas and require energy for heating and cooking. ❖ Some of the most profound impacts of the energy sector will be improvements in the lives of rural women. ❖ Reliable electricity supports SMEs in which majority women are employed, raising their incomes and saving time spent on domestic household chores like firewood collection. ❖ The average duration of study time for school going females will increase, and female dropout rate is expected to go further down. On the demand side, especially in rural areas, there is a need to relieve women and children from the burden of searching for firewood collected in long distances away from their homes. ❖ All stakeholders within the energy sector need to participate and take deliberate sensitization actions to encourage women participation in energy related education, training sessions, programmes and projects, planning, decision-making including energy policy implementation ❖ Empowering women is empowering the nation. ❖ Women are exclusively held in domestic household chores of cooking, fetching water, and collecting fire wood especially in rural areas without access to affordable electricity. ❖ Providing easy access to electricity for boiling water and cooking will specifically address women's time burden and they will use their time productively. ❖ The Biomass and Biogas strategy looks to ensure supply of improved cook stoves to especially the rural poor (predominantly women) as well as biogas for cooking and heating. ❖ This will help reduce women's burden of collecting fire wood, reduce government cost of preserving the environment through reforestation and ensure women productivity.
d. Gender Energy Related Data	❖ The first step towards ensuring that the specific basic needs of men and women are addressed over the short and long term is to collect data broken down by sex. Collecting, analysing and using gender-disaggregated data both at national and decentralized levels is necessary for the energy sector to take effective gender based policy decisions. ❖ The sector will reinforce the production, presentation and use of gender disaggregated data and regularly shared with interested parties and decision makers using the sector Management Information System (MIS) and other reporting platforms. ❖ Future policy making and strategy reviews should be very much informed by the gender disaggregated data.
e**. HIV and other Endemic Diseases' issues**	❖ The Ministry of Health broadcasts all her health-related programs on radios and Television alongside other social media. ❖ All these facilities require constant power supply without which communication will be delayed and or derailed. HIV and TB awareness campaigns to be broadcast over the same media will help reduce on infection and transmission rates as well and treatment provided by health centres.

f. Environmental Conservation and Green Growth	Although Lesotho still enjoys low carbon footprint, so far, she remains a net emitter of GHG. Efforts must be put in place to develop appropriate mitigation measures to reduce the levels of GHG emissions and enhance the county's sink capacity. As she develops, Lesotho should target to become a carbon neutral country. Lesotho has potential for renewable low carbon energy resources mix which is the foundation for a low carbon economy. The strategic objective of the climate change and low carbon development strategy is partly to achieve Energy Security and a Low Carbon Energy Supply that supports the development of Green Industry and Services. Green growth is an emerging concept that recognizes that environmental protection as a driver of global and national economic development. The development of Lesotho's energy resources will be in harmony with the green growth efforts. The Lesotho Meteorological Services (LMS) is finalizing a Climate Change Policy whose strategy among others is to encourage clan and green energy sources that shall ensure environmental conservation. The new domestic generation technologies such as solar, hydro and wind would be used for preserving the environment. Overall, efforts to mitigate impacts of climate change and preserve the environment include the following among others; ▪ **Reduce reliance on traditional biomass energy.** Government is working on a campaign to reduce reliance on traditional forms of biomass from 66% to 30% by 2022. This is being planned through the use of improved cooking technologies that reduce demand for wood fuel and emit less GHGs to the environment. Other initiatives related include the biogas program that is proposed to replace wood fuels for cooking as well as Improved charcoal carbonization techniques, increasing charcoal yield and so does the demand for wood cultivation. ▪ **Focus on local and renewable energy sources**. The strategy for the next 5 years going forward is to put preference on the exploitation of domestic resources such as solar, wind and hydro. ▪ I**ncreasing energy efficiency.** This will be done through **energy efficient** devices such as LEDs, Solar Water Heaters. Government encourages having all the new buildings installed with solar water heating systems to reduce use of electricity and biomass energy for boiling water. This is expected to reduce a great deal of the impact on the environment. ▪ **Mandatory Environment Impact Assessment (EIA)**. All power projects are presupposed to have environmental clearance and the Impact certification before project implementation. Where plants are operational before environmental clearance, a mandatory Environmental audit is proposed.

g. Regional Integration[31]	The goals of SADC Regional Energy Access Strategy and Action Plan developed in 2010 at the strategic level were meant to harness regional energy resources to ensure, through national and regional action, that all the people of the SADC Region have access to adequate, reliable, least cost, environmentally sustainable energy services, and at the operational level that the proportion of people without such access is halved within 10 years for each end use and halved again in successive 5 year periods until there is universal access for all end uses. Drawing on the analysis of the current energy access strengths and weaknesses in the region and guided by the expectations of the different stakeholders, the framework for achieving the above goals consists of the following 7 elements: ❖ **Statistics**: improved systems of providing accurate information, especially quantitative data, on energy access. ❖ **Applications**: focus on energy end-uses rather than technologies ❖ **Biomass**: recognition of the dominant role of biomass in the present and projected energy balance of most SADC countries. ❖ **Prices:** cost-reflective but competitive prices ❖ **Subsidies:** prioritize access over consumption subsidies ❖ **Development**: focus on use of energy to enhance economic productivity for poverty reduction and enhanced quality of life ❖ **Capacity**: ability and willingness to implement, operate and maintain energy access projects and programs Lesotho as a member of SADC enjoys electricity network interconnection with South Africa, which beyond providing a routing for import and potential export of power to South Africa and beyond, it supports Lesotho's network in terms of stability. That way, the country is able to install solar PV to the extent that would not have been supported by the Lesotho network if it was isolated. Regional regulatory framework and standards, exchange of good practices, etc., are other factors the community countries are benefitting from.

Table 2: Economic Transformation for Rapid Growth

[3] SADC Regional Energy Access Strategy and Action Plan: March 2010

4.1.2 SCOPE

The sustainable energy strategy is an important tool that is meant to guide the implementation of the energy policy. For it to be well informed, reflect population inclusiveness, be owned and thus effective in driving the energy sector development agenda, intensive consultations had to be carried out countrywide. The main objective of the consultations was to gather views, understand the situation on the ground including the needs, challenges faced and the citizens' expectations in order to come up with well-informed recommendations and roadmap for implementing the policy.

The consultations made covered all Ministries in the Government, other relevant Government Departments including the Parliament, Department of Energy (DoE), Lesotho Meteorological Services (LMS), National University of Lesotho (NUL), Lesotho Electricity Company (LEC), Rural Electrification Unit (REU), National Bureau of Statistics, Lesotho Highlands Development Authority (LHDA) – Katse and Mohale Dams, Muela hydro power station, Lesotho Electricity and Water Authority (LEWA), and Lesotho Petroleum Fund. Other stakeholders consulted are a number of private sector organizations, civil society agencies, as well as all Development Partners in the country. Besides these stakeholders, district administrators, councillors, Chiefs as well as community grassroots in all 10 districts were consulted.

APPROACH AND METHODOLOGY

While the dialogue held with some of the stakeholders including the Ministries was conducted through direct interviews, a questionnaire was used to gather information from the grass root communities in order to systematically understand the views of the citizens in regards to the energy supply situation in different ecological zones of the country. Reference was made on to the Lowlands, Foothills, Senqu River Valley and the Highlands for which characteristics vary from each other.

In some cases, consultations were done through participated in a number of public gatherings that were held by the Honourable Minister of Energy and Meteorology. Annex 2 provides the summary of the findings from the stakeholder consultations from which the key 'action oriented' recommendations form part of the strategic framework.

Figure 3 below demonstrates a schematic overview of the methodology and approach used in the development of the strategy.

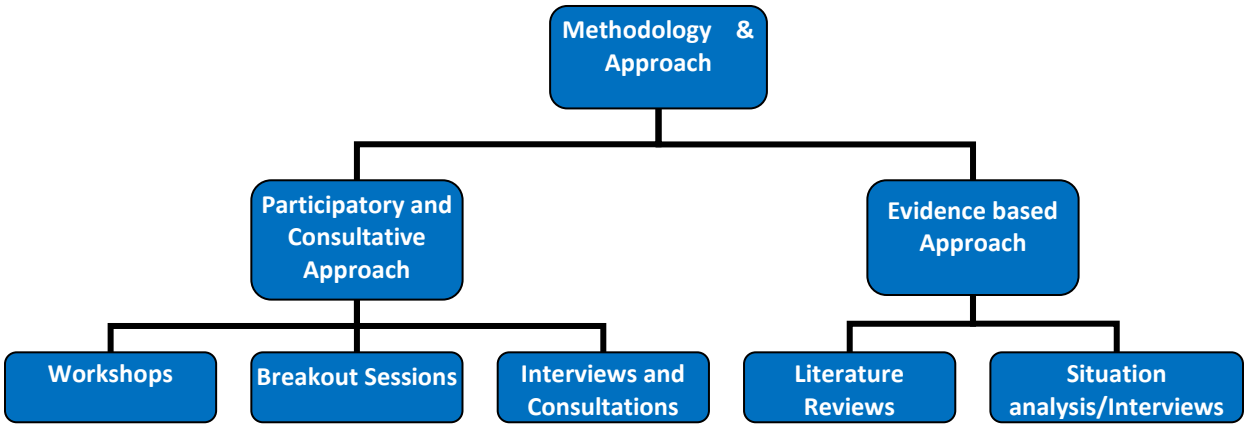


Figure 3: Overview of the methodology and approach used

- **Participatory and consultative approach** involved workshops. The Workshops were designed to engage stakeholders to generate discussion and to identify the most important issues related to energy supply situation, the effect and the impact to the people.
- **Evidence-based approach,** which involved the identification and prioritization of measures and actions based on literature review and an analysis of the linkages of sustainable energy to the socio-economic development of Lesotho. In addition to this, comprehensive literature reviews were conducted to fully understand and appreciate the energy sector prevailing situation. Data sources included national documents, existing relevant studies and other global related information and data.

STAKEHOLDER KEY MESSAGES

The stakeholders consulted were categorised in the following groupings, the feedback indeed reflected their respective day to day observations and concerns.

4.2 MINISTRIES

- Active participation, engagement and involvement of women in project planning and implementation since they are the main beneficiaries of natural resources.
- Capacity building and skills transfer: organizational training for strengthening expertise and skills on issues related to energy.
- Mitigation and low Carbon Development – This would aim at ensuring that actions are implemented in sectors that are emitters of greenhouse gas emissions. Energy and agriculture are key in this context.
- Private Sector: Supporting and Capacitating (finance models, partnerships models, investment incentives) the private sector play a meaningful role in sustainable energy projects.
- Managing the water-energy relationship: Addresses the nexus between water and energy. Along with the vast quantities of water that are abstracted and consumed during energy production, the massive amounts of electricity required for the conveyance, treatment and application of water in various circumstances is an issue of growing concern.

4.3 OTHER GOVERNMENT INSTITUTIONS

i. **LEC is a monopoly transmitter, distributor and supplier of energy**
   - Considering engaging in more clean energy generation for energy supply security purposes
   - Need for Institutional Structural adjustment to address transparency through unbundling of activities (Generation, Transmission and Distribution) to meet legal and regulatory requirements

ii. **REU**
   - Need for clear mandate and Resources
   - Clear policy on rural electrification with regards to independent grids and tariffing especially when using IPPs

iii. **LHDA: The main generator of electricity through 'Muela Hydropower plants.**

- ❖ Recognizes the importance of formulating the Climate Chang Policy and Sustainable Energy Strategy due to the impacts of climate change on water and potential effects to energy - key for Lesotho's sustainable social economic development

iv. LEWA

- ❖ LEWA encompasses the generation, transmission and distribution of electricity, and the supply as well as import and export of electricity. One of LEWA's prime responsibilities is to ensure that the supply of electricity is provided to industry and business, as well as domestic, public and government institutions in a manner that is affordable, reliable and cost-effective. LEWA Appreciates having a CC policy and SE strategy in place.
- ❖ Recognizes that there can't be a conducive and welcoming legal and regulatory environment without guiding policies and strategies on the regulated sectors.

v. Petroleum Fund

- ❖ Willing to contribute to Universal Access fund (increasing access through promotion of clean energy sources
- ❖ Need of catering for sufficient fuel strategic reserve for security of supply and price controls

vi. Districts (Administration and Grass Roots Communities) on energy use

- ❖ In Lesotho, the majority of the population is directly dependent on natural resources for survival. This dependence directly and indirectly, affects human welfare and sabotages the attainment of sustainable human development and also undermines environmental recovery.
- ❖ The majority of Basotho especially in deep rural areas depend on biomass energy (crop waste, coal, wood, animal dung and straws/shrub/grass) for cooking and space heating, and paraffin, LPG and to a lesser extent electricity for lighting.
- ❖ Cost of Electricity, LPG and Paraffin: Energy supply is increasingly becoming very difficult compared to traditional energy uses therefore government should consider ways of subsidizing the costs.
- ❖ Need for assistance in using clean energies: The electricity network covers major urban and some peri-urban centres, and supplies have been extended through most parts of the lowlands and the Senqu River Valley to reach all district headquarters in the mountains. Nevertheless, the electricity connections tending to be concentrated in the lowlands, rural areas remain heavily reliant on indigenous biomass fuels.
- ❖ Government should tap into other forms of energy, such as solar, wind and hydro since the country has them in abundance.
- ❖ Local communities need to be assisted through education on use of clean energies such as roof tops solar systems and for government to subsidize communities on the clean technologies in general, especially on rural based schools and clinics.

3. Civil Society

- ❖ Need for Adequate support from government for renewable energy and energy efficient technologies.
- ❖ Need for strong support in responding to enhancing and promoting sustainable biomass energy including Biogas needed for cooking and heating which also reducing environmental degradation. The success of Ha Bua Sono village in Berea district being promoted by TED was cited and needed strong support from Government for propagation in other districts in the country.

- ❖ Promotion of solar and hydro power sources in areas far from the grid to improve living condition in rural areas.
- ❖ Consideration of cultural uses/inclination of the use of firewood –, Basotho will always use wood for cultural ceremonies hence the Need to vigorously promote Afforestation and reforestation programmes done by Basotho themselves. Under such programmes, the National Tree Planting Day may be reinstituted.

5. Private Sector

- ❖ Need for Government support in promoting local manufacturers of energy products and technologies.
- ❖ Building expertise for production of clean energy technologies and products was cited as a requirement.
- ❖ Need for incentives to encourage engaging in clean energy technologies. This could be in form of tax wave on imports, etc.
- ❖ Support to ease difficulties in finance acquisition from Banks and/or guarantee funds or any other models/packages to facilitate financing.
- ❖ Development of new Industrial Infrastructure including Industrial zones, to facilitate ease in getting infrastructure support (electricity, water, communication) from Government, etc

6. Development Partners

- ❖ Recommending Public Private Partnership (PPP) especially on costly projects.
- ❖ Need for establishment of energy trade and service centres to facilitate backstopping services
- ❖ Involvement, empowerment and support to local communities - ownership of the projects and programmes.
- ❖ Need for a well-coordinated, broad – based stakeholder engagement including development partners themselves.
- ❖ Inter and intra – sectoral coordination mechanism and structures, but also amongst Development Partners to avoid duplication of efforts.

CHAPTER 5: SUSTAINABLE ENERGY STRATEGY FRAMEWORK

5.1 BACKGROUND

The Lesotho Sustainable Energy Strategy 2018-2022 is developed in response to the need to meet Lesotho's energy needs. The Government had made pledges that energy will be available for all Basotho at an affordable and sustainable manner and declared that the government will attest to achieving 50% electrification rate by 2020, ensure security of electricity supply using locally available renewable energy resources and to construct strategic fuel reserve that would assist other sectors of the economy by the year 2020.

5.2 OBJECTIVES

- To increase energy access.
- To promote availability of up-to-date energy resources information.
- Contribution to government revenue.
- To explore environmentally friendly energy sources and technologies.
- To improve Departmental service delivery.
- Ensuring security of energy supply.

The Kingdom of Lesotho, in her efforts to develop the energy sector has tried to align the strategy along the global, continental and regional development initiatives.

5.3 GLOBAL PERSPECTIVE: INTERNATIONAL AND REGIONAL INITIATIVES

The strategy makes close reference to the following international and regional initiatives;

- The Sustainable Energy for All initiative launched by the UN SG in 2012 as a multi-stakeholder partnership between governments, the private sector, and the civil society with three interlinked objectives to be achieved by 2030;

  - Ensuring universal access to modern energy services
  - Doubling the rate of improvement in energy efficiency
  - Doubling the share of renewable energy in the global energy mix

- **Africa-EU Energy Partnership 2020 Political Targets**

  Africa and the EU will take joint action to increase both energy efficiency and the use of renewable energy in Africa by:

  - building 10,000 MW of new hydropower facilities, taking into consideration social and environmental standards;
  - building at least 5,000 MW of wind power capacity;
  - building 500 MW of all forms of solar energy capacity;
  - tripling the capacity of other renewable, such as geothermal, and modern biomass; and
  - improving energy efficiency in Africa in all sectors, starting with the electricity sector, in support of Africa's continental, regional and sectoral targets."
  - Sustainable Development Goals; Goal 7 (Access to affordable reliable, sustainable and modern Energy), 13 (Climate Action: combating climate change and its impacts) and 15 (Life on Land: protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification), and halt and reverse land degradation and halt biodiversity loss.

- **The African Union Commission Agenda 2063** especially its aspiration 1 that calls for a prosperous Africa based on inclusive growth and sustainable development;

- **Revised Regional Indicative Strategic Development plan (RISDP) 2015-2020** for which amongst key strategic interventions call for reduction of food insecurity and Mitigation of Climate Change and Drought.
- Membership and participation in **SADC** energy initiatives including; Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), and SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), Southern African Power Pool (SAPP), etc.

5.4 NATIONAL PERSPECTIVE: DEVELOPMENT FRAMEWORKS AND INSTRUMENTS

5.4.1 THE DEVELOPMENT PATH

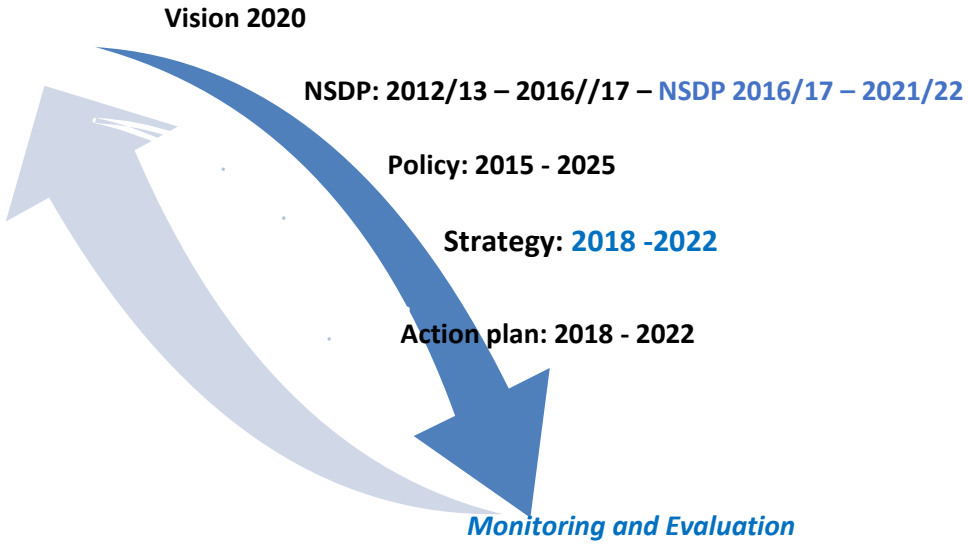


Figure 4: The strategy within the entire sector development chain

The Ministry of Energy and Meteorology through the Department of Energy is mandated to administer and coordinate the sector. The mandate of DoE further extends to the creation of a conducive environment for the development of energy resources through the development of energy policies, strategies and plans. **The Sustainable Energy Strategy 2018-2022 is therefore meant to be a 5-year rolling implementation plan** for the National Energy Policy 2015-2025. The strategy aims to achieve the near and medium term policy pronouncements that are reflected through the policy statements; namely; increasing energy access and increasing security of energy supply while promoting economic growth and job creation as stipulated in the National Strategic Development Plan (NSDP), among several others.

The Sustainable Energy Strategy shall observe the following national programmes and frameworks;

- **The National Indicative Programme (NIP)** with the financial allocation under EDF 11, has the objective of providing the Lesotho people and the productive sectors with access to a modern, clean, affordable, sustainable and reliable energy supply.

- Aligning with the **National Medium Term Expenditure Framework (MTEF)** under which Sustainable Energy enhancement is critical and cited as one of the priorities.

- **National Energy Policy** with the following goals and statements.

i. Goals

- Contributing towards the improvement of livelihoods
- Contributing towards economic growth and investment
- Ensuring security of supply
- Contributing towards the protection of the environment

ii. Statements

- **Policy Statement 1:**
  Institutional and Regulatory Framework for the Energy Sector; *Government will introduce appropriate institutional and regulatory framework for the management and development of the energy sector.*

- **Policy Statement 2:**
  Information Management and Outreach; *Government will ensure that sufficient information and data on all energy resources become available and are regularly updated.*

- **Policy Statement 3:**
  Bioenergy; *Government will ensure sustainable supply of bioenergy resources.*

- **Policy Statement 4:**
  Renewable Energies*; Government will improve access to renewable energy services and technologies.*

- **Policy Statement 5:**
  Energy Efficiency in Electricity; *Government will promote energy efficient practices and equipment in all sectors of the economy.*

- **Policy Statement 6:**
  Power Generation; *Government will ensure the security of electricity supply in the country.*

- **Policy Statement 7:**
  Power Transmission*; Government will develop and sustain a reliable and efficient transmission network in order to avoid interruptions in the power supply.*

- **Policy Statement 8:**

  Power Distribution; *Government will increase access to electricity for all socio-economic sectors to meet electrification targets within the framework of reliability, affordability and efficiency.*

- **Policy Statement 9:**

  Power Supply and Trad*ing; Government will ensure transparent and competitive electricity market operations where participating players have equal opportunities.*

- **Policy Statement 10:**

  Electricity Connections*; Government desires to ensure more connections and utilization of electricity by end-users.*

- **Policy Statement 11:**

  Importation and Storage of Petroleum Products; *Government will take measures to ensure security of supply of petroleum products.*

- **Policy Statement 12:**

  Distribution of Petroleum Products (Retailing and Transportation); *Government will ensure petroleum products are available and equitably distributed across the Country.*

- **Policy Statement 13:**

  End Users of Petroleum Products; *Government will ensure wider access to petroleum products and related services accessible to the end-users.*

- **Policy Statement 14:**

  Investment Framework and Financing; *Government will create an enabling environment that will attract investment and financing at all levels of the energy sector value chain.*

- **Policy Statement 15:**

  Energy Pricing; *Government will ensure that energy prices allow cost- recovery and that price setting is transparent.*

CHAPTER 6: SUSTAINABLE ENERGY STRATEGY ROADMAP 2018-2022

The Sustainable Energy Strategy (SES) of Lesotho lays out the implementation roadmap of the Energy Policy 2015-2025. The SES is a 5-year rolling plan and shall address the implementation roadmap which comprises energy sector proposed solutions to be implemented in the near-term (2018-2020), and the medium-term (2018-2022) time horizons. The sustainable energy strategy shall respond to the policy objectives and shall be implemented through the following 12 strategic pillars, namely;

Energy Strategy Pillar 1: Ensuring Security of Energy Supply
Energy Strategy Pillar 2: Increasing Energy Access

Energy Strategy Pillar 3: Increasing Energy Efficiency and Demand Side Management efforts
Energy Strategy Pillar 4: Effective Legal Regulatory and Institutional Framework
Energy Strategy Pillar 5: Private sector participation in energy activities
Energy Strategy Pillar 6: Civil society participation in energy activities
Energy Strategy Pillar 7: Ensure gender mainstreaming including women and youth and vulnerable groups participation in energy related activities
Energy Strategy Pillar 8: Response to environment, and climate change
Energy Strategy Pillar 9: Research and development, Innovations and Technology Transfer
Energy Strategy Pillar 10: Resources/funds mobilization for energy projects
Energy Strategy Pillar 11: Develop Energy Management Information Systems (EMIS)
Energy Strategy Pillar 12: Regional Integration and International cooperation

6.1 ENERGY STRATEGY PILLAR 1: SECURITY OF ENERGY SUPPLY

Security of Energy supply variables to be considered is electricity, petroleum and biomass. It is important to identify potential diversification of the energy mix, enhancement of transmission and distribution infrastructure. Under this strategy pillar, supply of sufficient energy with at least 20% reserve margin shall be enforced.

6.1.1 ELECTRICITY SUB-SECTOR

Lesotho generates 72 MW of electricity from Muela hydropower plant. According to LEWA annual report 2015/16, Lesotho had a peak demand of over 150MW in 2015/16, which was met by imports from Electricidade de Moçambique (EDM) in Mozambique and ESKOM in South Africa. Lesotho is a member of the Southern Africa Power Pool (SAPP), which interconnects the power utilities (transmission) in the SADC region. Over 50% of the electricity consumed in Lesotho is imported from South Africa (Eskom) and Mozambique (EDM). The table below shows the annual electricity imports from the 2010/11 to 2015/16.

Table 3: Lesotho Maximum Demand Profile (MW) for Period 2009/10- 2015/16

Year	Maximum Demand (MW)	Installed Capacity (MW)	Imported Capacity (MW)
2009/10	133.4	72	61.4
2010/11	138	72	66
2011/12	141.69	72	69.69
2012/13	147.63	72	75.63
2013/14	143	72	71
2014/15	149	72	77
2015/16	152.98	72	80.98

An overall assurance of supply depends on top-up on to the skyrocketing regional prices of electricity imports from Eskom and EDM. Domestic Muela Hydro Power (MHP) bulk tariff average stands at M 12/kWh: ($ 0,01/kWh) while the Eskom & EDM import tariff average stood at M 78c/kWh: ($ 0,065/kWh) in 2013/14.

The government of Lesotho has a target to achieve 50% of electrification rate by 2020 and to ensure security of electricity supply using locally available renewable energy resources.

Policy objectives;

- To improve security of power supply
- To ensure that base load requirements are met through local generation
- To maximize the development of indigenous renewable energy resources
- To enhance the participation of the private sector and cooperative associations in electricity supply industry

Challenges

- Increasing power demand in the country
- High capital costs of Renewable Energy
- Low awareness about RETs and access to information on RETs
- Low involvement of the private sector in new on-grid and off-grid power generation
- Uncertainty on resource potential of hydro potential in the country and required assessment of wind, solar and biomass potential.

Actions

6.1.2 SECURITY OF SUPPLY IN THE ELECTRICITY SUBSECTOR

The electricity subsector comprises electricity generation, transmission and distribution. It is critical for Lesotho to become self-sufficient with its electricity. The country needs reliable electricity sources to meet base load. The Lesotho Electricity Company identified hydro as an important source to meet Lesotho's grid electricity base load. On the basis of expected electricity demand as per LEC reports, the incorporation of new generation capacity has to meet part of the demand and adhere to national electricity targets.

6.1.3 ON-GRID ELECTRICITY GENERATION

On-grid electricity generation comprise hydro, wind and utility- scale solar power plants. The construction period of utility scale hydro power plants is between 5 to 7 years. During the construction phase of the planned hydro power plants, Lesotho will install solar and wind power plants. Below is list of potential power plants for Lesotho:

i. Electricity Generation

- **Hydro Electricity**

  Lesotho has one large 72MW hydro power station: Muela hydropower plan that was commissioned in 1998 under the phase 1 of the Lesotho highlands Water Project. In addition to Muela there is one other operational small hydro power plant 180 kW at Semonkong.

- **Solar Energy**

  Solar energy comprises of different categories namely: solar Photovoltaic (PV), Concentrated Solar Power (CSP) and Solar Water Heating (SWH). Lesotho experiences some of the highest levels of solar

radiation in the World. Solar technologies are either solar thermal collectors or photovoltaic. Solar energy can be used to generate electricity; heat water; and to heat, cool and light buildings. There is a considerable potential for solar energy generation in Lesotho as identified by the draft Electricity Generation Master-plan. The technologies used in Lesotho include solar water heaters, solar home systems and solar PV; however, they have not been fully deployed. Solar energy is used by several sectors in Lesotho, this include communication industries, Health, Public institutions and households. The deployment and promotion of solar energy during the implementation of Africa Adaption Programme and Lesotho Renewable Energy Based Rural Electrification (LREBRE) contributed significantly to the utilisation of solar energy.

- **Solar Electricity Generation**

  Solar energy can be used for electricity generation both as photovoltaic and solar thermal. The technology can provide electricity generation ranging from small to medium stand-alone applications to large scale grid connection. Lesotho currently has one grid connected solar power plant located at Moshoeshoe 1 international airport with an installed capacity of 280Kv. There are other small solar home systems installed by private sector at various households for provision of electricity needs.

- **Wind Energy**

  Wind energy uses the naturally occurring energy of the wind to generate electricity. Lesotho has a great wind power potential. According to the NSDP, preliminary assessments indicate that Lesotho has potential to harness about 6000MW of wind power (NSDP 2012-2017….). According to the National Energy policy statement number 4 “Renewable energies” is targets to promote renewable energy resource wind included. International Finance Corporation (IFC) developed a feasibility study on three sites to assess wind power generation, the sites were Mafika-Lisiu and Lebelonyana, the findings of the study further emphasize the wind power potential for Lesotho.

PROPOSED LEC INVESTMENT PORTFOLIO (2018-2023)

1. Generation programme

generation location	generation type	anticipated capacity	Cost estimate(million USD)	feasibility	finances mobilisation	planned start Implementation	complete implementation
Mafeteng	Solar	40MW	30	2018	2018	2019	2020
Semonkong	Solar	10MW	10	2018	2018	2019	2019
Semonkong	wind	20MW	25	2018	2018	2019	2022
Mphaki	Wind	50MW	80	2018	2019	2021	2022
Upgrade MantsonyaneHP	hydro	10MW	40	2018	2019	2022	2025
Sequ HP(cascades)	hydro	500MW	1000	2018-19	2020		
Tsoelike	hydro	20MW	80	2018-20	2020	2021	2027
TOTAL		630MW	1265				

Table 4: Proposed LEC Investment Portfolio 2018-2023

❖ **Electricity Masterplan**

Assessment and prefeasibility studies in the Draft Generation Master-Plan 2006 indicate that Lesotho has over 500MW hydro power potential. The assessed sites include Senqu River with an estimated potential ranging between 100 and 200MW, the Makhaleng River with potential of 10 to 20MW as well as Hlotse River among others. Detailed feasibility studies are required for the development of these projects.

The Department of Energy is the process of updating the Electrification Masterplan. The project is aimed at increasing electricity access and identifying countrywide electricity generation options for Lesotho through Technical Assistance Facility (TAF) of the European Union.

The TAF also has a component of reviewing the energy stakeholder mandates and strengthening the coordination function of the Department of Energy. Moreover, TAF has proposed the financing frameworks for electrification in Lesotho. The proposal is that grid expansion should be partly financed under the Universal Access Fund while all off-grid electrification should be the mandate of rural electrification unit. It is further proposed that, the rural electrification unit should be restructured into a rural energy agency and financed through different approaches including establishing a levy on concessional tariffs and from international donors. Tables 5, 6 and 7 provide the Power Masterplan developed in 2009 which is currently being updated, however, it provides the overview of the situation in general.

Project	River	Capacity/Specification	Cost	Status	Remarks
1. Muela Hydropower Project (Phase-1)	Malibamatšo / Senqu(orange)	Capacity=72MW	M483.0 mil Sept 1989	Plant was commissioned in 1998 and has been under commercial operations since.	Taking into account the existing situation in the region (ecological, energetic and other) this project is considered to be positive
2. Muela Hydropower Project (Phase-1)	Malibamatšo/ Senqu (orange)	Capacity =110MW Output=516GWh/annum Ave net head=170m		Plant is an expansion (phase) of the 'Muela Hydropower generating station, the detailed feasibility of which will be considered holistically with LHWP phase 2 feasibility studies.	The expansion of the Muela Hydropower has to be made with Polihale project after full feasibility study, as it is envisioned in the second phase of the LHWP.
3. Oxbow Hydroelectric Project	Malibamatšo	Capacity=80MW Output= 516GWh/ annum	US$	Feasibility studies completed in 1989 by Monenco Consultants Ltd of Canada under funding from CIDA. Project suspended due to LHWP Phase 1 certainty.	Despite of lack of information the project needs to be restudied. As the project was finished in 1989, the feasibility study has to be reassessed and it has to be defined whether it envisions current demands or not.
4. Jordan Multipurpose Project	Senqunyane	Capacity=36MW Output=200 GWh/annum	M396.0 mil Jan.1984	Original pre-feasibility done by HYDROPLAN Consultants under west German Aid Program. Project also envisaged as a water supply scheme to the lowland. Project suspended due to LHWP Phase 1.	None
5. Quthing small Hydropower Project	Quthing	Capacity=15MW		Identification and pre-feasibility studies funded by the Austrian Government in 1984. SADCC Energy Ministers approved im1989 as SADCC project 3.3.5 Attracted very little interest in favor of big plants.	As the project was finished in 1984, the feasibility study has to be reassessed and it has to be defined whether it envisions current demands or not. It can be reviewed as the last stage of Quthing cascade.

Table 5: Large hydropower stations

Source: Lesotho Power Generation Master Plan Project # lec/gen/1-2009

Project	River	Capacity/ Specification	Cost (USD million)	Status	Remarks
1. Tlokoeng	Khubelu	670 KW	0.321	Commissioned in early 1990	Despite the fact that the station is in operation, the negative part of
2. Motete	Motete	524 KW	0.408	Feasibility Study was conducted in early 1980s by SOGREAH Consulting of France	As the project was finished in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
3. Qacha's Nek	Tsoelike	482 KW	0.526	Feasibility Study was done by SOGREAH funded by France. Commissioned in mid 1990.	As the study was conducted in 1990, the feasibility will have to be reassessed, to define exact technical parameters and its
4. Mokhotlong	Bafali	242 KW	0.400	Feasibility Study was conducted in early 1980s by SOGREAH Consulting of France.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
5. Mokhotlong	Sehonghong	205KW	0.480	Feasibility Study was conducted in early 1980s by SOGREAH Consulting of France.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
6. Semonkong 1	Maletsunyane	120 KW	0.320	Phase-1 180 KW Plant commissioned in November 1988. Phase-2 not started although provisions are in place to expand the station to 400KW	As the study was conducted in 1988, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
7. Lesobeng	Lesobeng	110 KW	0.496	Feasibility Study was conducted in early 1980s by SOGREAH Consulting of France.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
8. Sehonghong	Sehonghong	700KW	1.640	Feasibility Study done by SOGREAH, funded by France	The feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
9. Sehlabathebe	Tsoelike (Leqooa)	100/245 KW	0.760	Feasibility Study was conducted in early 1980s by SOGREAH Consulting of France.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
10. Mokhotlong 1A	Mokhotlong	800 KW	0.281		None
11. Mokhotlong 2A	Mokhotlong	700 KW	0.265		None
12. Mokhotlong B	Mokhotlong	1500 KW	0.288		None
13. Semonkong	Maletsonyane	340 KW	0.088	Feasibility Study done by NORPLAN, funded by Norway.	As the study was conducted in 1984, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
14. 'Mantšonyane	Mantšonyane	2000 KW	0.098	Feasibility Study done by NORPLAN, funded by Norway.	As the study was conducted in 1984, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
15. Sehlabathebe	Tsoelike (Leqooa &	150 KW	0.680		None

Project	River	Capacity/ Specification	Cost (USD million)	Status	Remarks
	Tsoelikana)				
16. St. Teresa	Masnat	200 KW	0.380		None
17. Lethena	Quthing	2000 KW	0.244		None
18. Mosetlelo	Quthing	2500 KW	0.344		None
19. Likhabaneng	Likhebaneng	4500 KW	0.400		None
20. Pitseng	Tsainyane	70 KW	0.384	Pre-feasibility studies were conducted by Taiwan Power Company in the mid-1980s.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
21. Ha Ntsi	Liphiring	30 KW	0.904	Pre-feasibility studies were conducted by Taiwan Power Company in the mid-1980s.	As the study was conducted in 1980s, the feasibility will have to be reassessed, to define exact technical parameters and its ability to comply with current requirements.
22. Mokhothlong	Mokhotlong	795 KW	0.235		None

Table 6: Micro and mini hydropower stations

Source: Lesotho Power Generation Master Plan Project # lec/gen/1-2009

Project	River	Capacity/ Specifications	Cost	Status	Remarks
1. Monontša Pump/ Storage	Pitseng River (tributary of the Caledon River)	Capacity=1 000MW Net Static Head=620m		Memorandum of Understanding on the Project was signed between LHDA and Eskom in April 2004. Pre-feasibility studies shortly to commence.	The project is acceptable, but for the next stage of the project development diversion length has to be reassessed together with the reservoir location.
2. Three other pumped storage project	On 4 different Location.	≥1 000MW each option at net head of ≥500 m		The first pumped storage project Monontša was the most preferred site of the three identified in comparison of a number of factors. The 3rd option to consider is the feasibility of up to 1,500 MW peaking plant at LHWP Phase2 Mashai Dam.	Despite of the lack of information on LHWP phases 2, 3, 4, and 5, we still can conclude that during the reservoir operation the water level changes down to minimum operation level will cause the increase of waterway length, which will have negative influence on Pumped Storage Plant.

Table 7: Pump storage plants

Source: Lesotho Power Generation Master Plan Project # lec/gen/1-200

❖ **Electricity Transmission**

Transmission and distribution lines in Lesotho are owned by LHDA and LEC. LHDA owns the transmission and distribution lines that were developed under Phase I of the Lesotho Highlands Water Project.

The Transmission network evacuates power from the generation sources namely 'Muela Hydropower (LHDA), Eskom (South Africa) and EDM (Mozambique) to LEC load centres. The supply from 'Muela and Eskom plus EDM (at Maseru intake) is transmitted through the 132kV lines to Maputsoe Substation and Mabote Substation respectively. The supply from Eskom (Clarence intake) enters Lesotho through 88kV line at Khukhune Substation in Butha-Buthe, while Qacha's Nek intake is through 22kV line from Matatiele.

The transmission lines are of voltage levels 132kV (588Km), 88kV (86Km), 66kV (80Km), and 33kV (863Km). However, there are places where LEC distributes with 33kV like Thabana Morena in Mafeteng. The transmission voltages are stepped down to distribution voltages through 45 substations of which six of them namely Mabote, Mazenod, Maputsoe, Ramarothole, Litsoeneng and Khukhune Substations are critical for the supply of electricity countrywide. Qacha's Nek and Mokhotlong districts are the only districts that are not connected to the main national grid.

The Distribution network distributes power from substations to electricity users. The Distribution network ranges from the voltage of 11kV up to the customers supply at 220V and 380V.

❖ **Feasibility Studies**

The Lesotho Electricity Company developed a desktop study in 2009 to identify potential sites for electricity generation in Lesotho. The prefeasibility studies were carried out, and there is need to further develop fully fledged feasibility studies. Below is a list of pipelined power generation feasibility studies:

- Hydro Power Generation 100-200MW plant at Senqu
- LHDA developing feasibility study for 120MW hydro power plant at Senqu River
- Feasibility study development by Lowlands Water for multi-purpose dams at, Hlotse 10MW, Makhaleng 40MW
- 70 MW solar Plant funded under FOCAC

6.1.4 SECURITY OF SUPPLY IN THE PETROLEUM SUBSECTOR

Ensuring petroleum products availability and equitable distribution across the Country

Lesotho does not have any natural gas, oil or coal reserves and is highly dependent on imported fossil fuels for its energy requirements for transport, household and industries. Petroleum plays an important role in development of the economy particularly in the transport, household and services sectors.

The Lesotho Energy Balance 2009-2011, states that there was a total supply of 11,095.98TJ of which comprised of 1976.87TJ of Electricity and 8493.98TJ imported Petroleum. The picture below illustrates the petroleum mix for Lesotho in 2016/17:

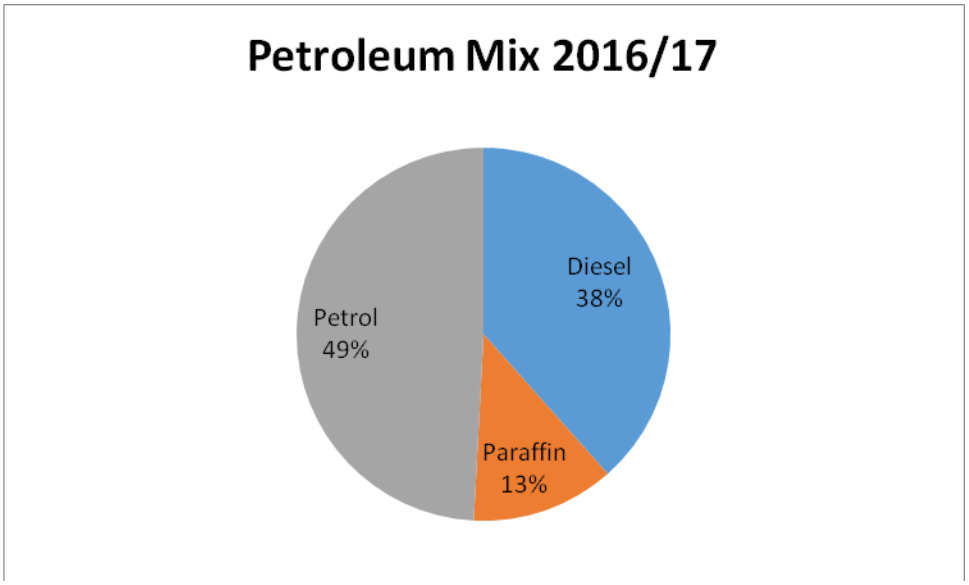


Figure 5: Petroleum products mix in Lesotho

Source: Department of Energy 2016/17 report

As shown above, petrol constituted to 49% of the total petroleum mix followed by diesel and paraffin with 38% and 13% respectively. The total volume of petroleum imports was 258,652,000. Illuminating Paraffin is mainly used for household cooking and lighting purposes, while petrol and diesel are used for transport and industry energy needs. The demand for fuel has increased significantly over the past years; this is demonstrated by the increased amount of fuel consumption. The table below depicts fuel consumption trends for financial year 2016/17.

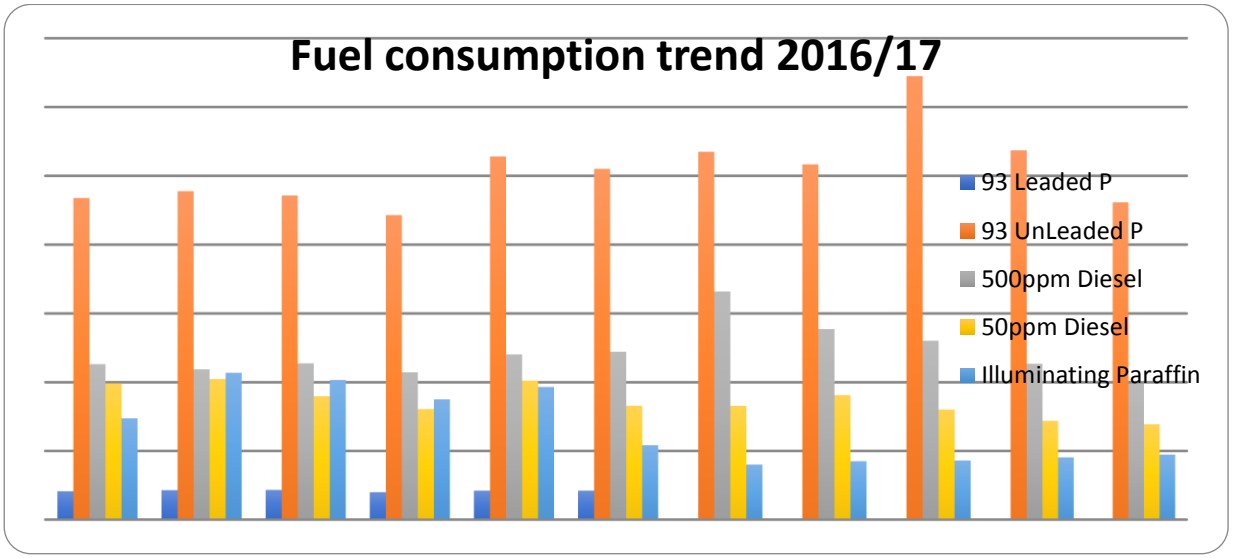


Figure 6: Fuel consumption patterns

The current Lesotho oil industry has a commercial buffer stock of approximately 3 days which is not sufficient to sustain local demand when there is fuel supply disruption from RSA. This may lead to significant negative economic repercussions.

i. Recent Developments in the Petroleum Subsector

a. Petroleum Bill

In its mandate, the DoE is required to develop policy and regulatory frameworks in the energy sector. The DoE has drafted the Petroleum Bill. The Bill creates enabling environment for private sector participation in the petroleum sector.

b. Revenue collection

The revenue collection from Petroleum levies and Motor vehicle assurance are entrusted to the DoE through its Conversional Energy Division. In 2015/16, the DoE proposed increase in the oil levy from M0.44c to M0.60c. MVA increased from M0.08 to M0.10c. These increments lead to a significant increase in the revenue collected. Below is a table comparing the revenue collection before and after the levy changes.

Revenue	2015/16	2016/17
Oil Levy	91,930,131.87	113,375,213.52
MVA	17,491,878.00	19,681,795.26

Table 8: Revenue collection before and after the levy changes

Policy objectives

- To create a conducive environment for participation of local entrepreneurs in the petroleum retailing and transportation
- To promote investment in rural areas
- To ensure fair distribution of petroleum products across the country.

Challenges

- Insufficient storage capacity
- Lack of capacity for quantitative and qualitative verification of imported petroleum products
- Adulteration of products remain an issue
- Low capacity in ensuring standards and compliance
- Lack of legal enforcement on aspects pertaining to petroleum products supply services

Actions

The Petroleum subsector shall be strengthened through the following strategic actions

- Strategic Fuel Reserve: Feasibility Studies: 90 days' strategic reserve by 2020 following the Government call for Building and maintaining an adequate storage facility that will meet at least two months of fuel supply
- Regional depots-north, south and central regions
- Developing and Ensuring Standards in collaboration with the Ministry of Trade
- Setting and clearly defining minimum commercial "buffer" stock to be kept by oil companies

- Maintaining joint procurement of petroleum products within the Southern African Customs Union (SACU) region
- Developing guidelines for entry, operation and exit of petroleum sector market to ensure petroleum products delivery is not interrupted
- Empowering local business to participate meaningfully in the petroleum and gas industry
- Investigating and introducing alternative mechanisms of fuel supply (road, rail or pipeline) in collaboration with the Petroleum and Gas industry
- Working in collaboration with the Ministry responsible for mining to explore oil and gas.
- **Transportation of petroleum by Basotho**

The Ministry of Energy has taken strides towards the implementation of Energy Policy 2015-2025, in 2015/16, the government sent call for expression of interest to private Basotho transporters. The call was targeted to identifying potential local transporters of fuel in Lesotho. The development of these activities addresses the goal of job creation and private sector participation in the energy sector.

- **Strategic Fuel Reserve**

The Government of Lesotho established the national oil company named Lesotho State Oil Company (LESOC) in 2010. The company was established with the purpose of purchasing and importing petroleum products into Lesotho from the international oil markets, supplying to the local oil marketing and distribution companies as well as managing the strategic fuel storage of the Country. In the 2015/16, the DoE advertised and call for proposal on the development of the strategic fuel reserve feasibility study. The programme is on-going a company have been shortlisted. The objective of the fuel reserve facility is to store at least 60days strategic reserves of petroleum products.

- **Regional Fuel Depots**

The Ministry of Energy submitted a project proposal for funding from Petroleum Fund. The project comprises of undertaking a study on the distribution of petroleum products in Lesotho. The results of the study will determine the construction of petroleum products infrastructure in the under-served and or growth centre in order to increase energy access. The petroleum products infrastructure (filling stations) in growth centres will be multi-purpose centres where essential energy products will be sold.

6.1.5 SECURITY OF SUPPLY OF THE BIOMASS AND BIOENERGY SUBSECTOR

The Department of Energy shall embark on promoting and disseminating biomass and biotechnologies including biogas in the country through increasing biomass production, promoting biomass substitution as well as promoting biomass saving.

Policy objectives

- To improve the availability and sustainable use of bioenergy resources
- To promote the conversion of bio waste to energy for power generation and heat

Challenges

- High dependency on Biomass Energy for cooking and heating especially in rural areas
- Scarcity of Biomass energy sources
- Lack of skills for proper management of biomass energy generation sources and supply chains

Actions

6.1.6 INCREASING BIOMASS PRODUCTION

- Collaborate with Ministry of Forestry and civil society to ensure availability of biomass resources
- Integrating tree planting into farm landscapes
- Strengthening the voluntary tree planting schemes especially in rural based communities
- Encouraging Institutions (public and private) to establish their own woodlot schemes to provide fuel wood supply.

6.2 ENERGY STRATEGY PILLAR 2: INCREASING ENERGY ACCESS

Increasing Energy access variables to be considered are electrification ACCESS TO modern, CLEAN and renewable energy sources and technologies as well as Distribution of petroleum products.

According to LEWA, rate of connection to the main electricity grid is about 42% which translates to 192,838 connected households, thus by 2015, the electricity per capita was about 300kWh. (LEWA 2015/16 annual report). This connection is primarily concentrated in the urban and growth centres where infrastructure services are relatively well developed in terms of transmission and distribution. Less than 8% of the area serviced by grid is defined as rural.

❖ Policy objectives

- To drive economic growth and improve livelihoods
- To open up distribution to both the public, private sector and cooperative
- To implement electrification programme and projects
- To support area planning of electrification schemes in rural and urban areas

❖ Challenges

- Lack of baseline data for proper analysis of the access to modern energy services particularly for thermal applications and productive uses at small scale production levels.
- Inadequate private investment in modern energy supplies and technologies for cooking and other thermal applications.
- Short term initiatives by donors and NGOs that need to be sustained
- Electricity supply is a limitation to meet the growing demand both in households and industry in rural connections limited by restrictive grid extension/maintenance,

❖ Actions

OFF-GRID SOLUTIONS

- **IMPORTS FROM SOUTH AFRICA TO BORDER DISTRICTS**:
  For distant districts from the national grid but bordering South African regions that have electricity, importation across shall be ideal as part of regional integration and power trade. The Dili-Dili Senqondo pilot in Quthing District where about 278 households have been connected is a successful model.

- **Mini-grids in rural areas**

  The European Union Delegation "Called for Proposal" with an objective of increasing energy access in rural areas through increasing household devices, distribution, after sales structures and mini-grids. The project entails piloting mini-grids in rural areas, commercialisation of access to improved energy household devices including energy efficient stoves and solar home systems. The call further extends to establishing infrastructure and addressing logistical challenges associated with developing sustainable energy products and service businesses within rural communities. The target beneficiaries for this project are rural communities and small enterprises. Actions under this project should aim at sound business models, provision of clean energy and energy efficient household devises and access to renewable energy in isolated un-electrified rural areas.

- **Mini and Micro grids: SE4ALL project: 10 mini grids in 5 project sites in districts**

  The Department of Energy is implementing a 5-year project in collaboration with the United Nations Development Programme. The purpose of the project is to catalyze investments in renewable energy-based mini-grids and Energy Centers to reduce GHG emissions and contribute to the achievement of Lesotho's Vision 2020 and SE4All goals. The activities of the project include development of creating enabling environment for the deployment of renewable energies and climate change mitigation, energy data collection and analysis as well as pilot of village energization schemes through energy centers and mini-grids.
- The purpose of the project is to meet local base load demand by local generation which links with the NSDP objective of producing a medium-long term strategy for improving national energy security. The project also addresses the objective of the National Energy Policy 2015-2025 of "ensuring security of supply" using alternative energy resources: Mini-grids installation is one of the options to undertake thereby increasing economic development in isolated areas. The following proposed projects could be considered.

1. Mohale's Hoek	Ketane (Ha Nohana)	microhydro (Ketane river)	52 kWh. 5-kW
	Ribaneng	microhydro (Ribaneng river)	65 kWh. 5-kW
2. Mokhotlong	Matsoaing	PV	52 kWh. 12 kW
	Tlhanyaku	microhydro (Senqu river)	52 Wh. 5-kW
3. Qacha's Nek	Sehlabathebe (Mpharane)	microhydro (Leqooa river)	60 kWh. 5 kW
	Lebakeng	microhydro (Lebakeng/Senqu river)	65 kWh. 5 kW
	Tosing (Dalewe)	microhydro (Sebapala river	65kWh. 5 kW
4. Quthing	Sebapala (Ha Sempe/Lefik eng)	microhydro (Sebapala river)	60 kWh. 5 kW
5. ThabaTseka	Sehonghong	microhydro (Sehong-hong /Senqu river)	65 kWh. 5 kW
	Mashai (Moreneng, St. Theresa)	PV	60 kWh. 14 kW

Table 9: Proposed mini-grids projects supported under UNDP-SE4ALL Project

6.2.1 ACCESS TO CLEAN, MODERN AND RENEWABLE ENERGY SOURCES AND TECHNOLOGIES

- ❖ Improve sustainable use of biomass resources
- ❖ Develop innovative financing and delivery mechanisms, to enhance access
- ❖ Facilitate the establishment of Rural Energy Service Companies (RESCOs)
- ❖ Promote the application of renewable energy technologies to income-generating activities

- Implement a demand side management strategy
- Introduce an effective Information Education and communication in energy efficiency
- Promote the use of renewable energy technologies
- Promote energy efficiency in buildings
- Introduce a tariff structure that supports energy efficiency
- Encourage use of energy efficient cook stoves in households and in institutions
- Develop and implement energy efficiency programmes in the petroleum sector
- Promote energy conservation measures

6.3 ENERGY STRATEGY PILLAR 3: ENERGY EFFICIENCY AND DEMAND SIDE MANAGEMENT

Policy objectives

- To minimize losses in energy processes
- To reduce energy imports in meeting demand

Challenges

- Use of incandescent lamps still practiced
- Use of electricity in water heating
- Old networks registering power waste through technical losses
- Lack of skills in energy efficiency technologies

Actions

- Implement a demand side management strategy
- Introduce an effective Information Education and communication in energy efficiency
- Promote the use of renewable energy technologies
- Promote energy efficiency in buildings
- Introduce a tariff structure that supports energy efficiency
- Encourage use of energy efficient cook stoves in households and in institutions
- Develop and implement energy efficiency programmes in the petroleum sector
- Promote energy conservation measures
- Electricity systems Improvement and network rehabilitation

Lesotho Electricity Company (LEC) is responsible for transmission and distribution of electricity.
The electricity network is currently dilapidated and thus requires an intense maintenance and rehabilitation to curb unnecessary electricity losses.

Over the years there has been minimal maintenance of electricity infrastructure which led to capacity losses. Poor infrastructure also adversely impacts the electrification rate. In 2015/16, the Government of Lesotho developed a proposal for rehabilitation of electricity infrastructure.
Consisting of the refurbishment of switching stations and transmission lines, the project also entails construction of an 8km, 132kV transmission line and expansion of the Khukhune substation. Improving the reliability and quality of electricity supply to existing and new customers in Lesotho are among the objectives of the project. The upgrade of the electric power distribution system is expected to result in the reduction of losses and outages by two percent and 25 percent respectively, and an increase of five percent in the system availability.

The rehabilitation of the switching stations in the main load centre, Maseru, is expected to reduce interruptions in supply and have positive impacts on the entire countywide distribution network. This would enable expansion of access to various parts of the country in the short-term. The project is being implemented through the Lesotho Electricity Company (LEC).

- **Households**

  The Ministry of Energy and Meteorology in collaboration with Lesotho housing drafted building code for houses in Lesotho. The code provides appropriate guidelines for the construction of thermally designed houses; the structure is aimed at minimising energy consumption in the household sector.

- Other initiatives that can lead to energy efficiency in the household sector include:
  - Replacement of electric geysers by solar water heaters;
  - Replacement of incandescent bulbs by energy efficient bulbs;
  - Installation of smart metering

  Lesotho Electricity Company developed a proposal on smart-metering; the objective of the project is to manage electricity demand through promotion of energy efficiency. The project entails installation of smart meters, management system and communication network to link smart meters and management system.

- **Service Sector**

  Energy efficiency measures in Lesotho service sector include installation of solar water heaters in public institutions such as the health sector. The Ministry of Health installed solar water heaters in health clinics.

- **Solar Street lighting**

  The Department of energy is implementing the project on solar street lighting, the objective of the project is to minimise electricity consumption through rolling out installation of solar street lights in growth centres. This initiative will reduce reliance on electricity imports while at the same time delaying development of new electricity generation plant.

- **Promote Energy Efficient appliances such as energy efficient cook-stoves**

  The improved methods of combustion such as clean stoves that are more efficient when combined with sustainable utilisation of wood biomass can benefit rural communities

  The government implemented a pilot project at Lekokoaneng Multipurpose Clean Energy Centre, the centre is community owned entity located in the Berea district. The pilot project was aimed at introducing Pro Poor Public Private Partnership through the energy sector. The project entailed established of an energy centre that is aimed at promoting renewable energy technologies and information dissemination. The centre serves as a one stop shop of renewable energy technologies including among others energy efficient cook stoves and solar geysers.

  Energy efficient cook-stoves are being assembled in Lesotho and distributed by local NGOs to rural communities through various subsidy and financing schemes. According to the African Clean Energy Survey (Lesotho) approximately 4,560 African Clean Energy (ACE) and 10,000 Solar Lights cook stoves

have been sold in Lesotho; the estimated total available market is about 353,000 households. There are also retained heat devices like wonder bag (Sephehise sa mohlolo) that are being promoted by the local NGO (Technology for Economic Development) this device reduce burden on biomass. Furthermore, the GoL through it research and development centre, Appropriate Technologies Services (ATS), is also developing affordable efficient cook stoves that have a dual function for space heating. ATS is also trying to develop other energy efficient household technologies including solar fruit and vegetable driers, commercial scale solar box cookers, and solar hot water collectors.

- **Promotion of Biogas Technology**

  Technology for Economic Development (TED), in partnership with some international organizations promotes biogas technology in Lesotho. TED takes the institutional project lead with international, national and local contacts and skills, supported by the Department of Energy (Ministry of Energy, Meteorology and Water Affairs), and the Department of Environmental Health (Ministry of Health).

  The project addresses the needs of rural households and communities in Berea District to have secured access to energy, as they suffer from decreasing biomass resources used to fuel cook stoves: trees and shrubs are de-rooted, women burn animal dung instead of applying it for improved soil fertility; erosion of arable land endangers food security and destroys the basis of rural livelihood. In addition to prefabricated biogas plants, the connection of safe toilets to the systems will enhance the rehabilitation of the environment and protect water sources from fecal contamination.

  For the first time, 100 prefabricated biogas plants of different technology providers connected to hygienic dry toilets, will be installed in up to 5 locations in Lesotho. Currently there are about 600 biogas digester installed in Lesotho, half of them through TED

- Promote waste to energy for energy production
- Promote research and development in the field of biofuels

- **Capacity Building**

Under this strategy, energy efficiency development in the country by 2022 will include the developed institutional framework, capacity and methodology infrastructure, practical experience in different industries and government buildings as well as development of Energy Efficiency strategy.

6.4 ENERGY STRATEGY PILLAR 4: LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

The strategy entails having effective and efficient Institutional governance in place. Efficient and effective performance of the sector shall depend on the governance of the sector along the entire chain of responsibilities and the sector governing hierarchy.

Policy objectives

- To improve institutional and legal framework for implementation of the energy policy
- To introduce mechanisms that will monitor compliance with respect to set standards

- To foster clarity and separation of roles and responsibility in the energy sector
- To strengthen the coordination function of the Department of energy and enhance energy sector coordination forum.

Challenges

- Lack of effective institutional arrangement in the sector
- Lack of Energy Sector Act that would enable legal and regulatory enforcement of the policy and strategy

Actions

6.4.1 ENSURE INSTITUTIONAL SETUP AND DEFINE CLEAR MANDATES

- Define functions and the respective responsible organs with clear demarcations of activities and mandates as well as clear chain of command within the Department
- Match the functions and responsibilities including titles of officials to regional practices
- Ensure coordination amongst different institutions in the sector

6.4.2 ESTABLISH WELL FUNCTIONING LEGAL AND REGULARTORY FRAMEWORK

- Set and ensure compliance to minimum safety, health, environmental, risks, Quality (SHERQ) and service standards in the energy sector.
- Ensure adherence to the Transmission Grid Code as well as Quality of Supply and Service Standards to guarantee reliability of power supply.
- Enforce compliance to the Distribution Grid Code and Quality of Supply and Service Standards to ensure reliability of power supply.
- Develop standards, codes of practice and specifications for mini and off-grid solutions.
- Regulate tariffs including the REF-in-Tariffs to ensure level ground power trade and encourage investments
- Monitor the performance of energy operators including the utility to ensure quality service to consumers
- Establish technical standards and quality assurance for the purchase, installation, and maintenance of electricity production and energy storage facilities used for self-supply.
- Impose where necessary and relevant and collect levies on energy services and products.

6.4.3 STRENGTHEN INSTITUTIONAL CAPACITY

- Assess the skills and capacity gaps in the Department of Energy and all its affiliate sub-departments.
- Establish the required training both in house and out as deemed appropriate
- Develop a capacity building plan
- Exchange of good practices by staff attachment and internships in other countries in the region where relevant. This could be through technology exchange, skills enhancement

6.4.4 STRENGTHEN ENERGY SECTOR COORDINATION

- Legislate the Energy Policy and develop and Energy Act to assist in clearing the mandates of different Institutions in the sector
- Strengthen Energy Sector Coordination Forum and other sub-sectoral coordination forums

6.5 ENERGY STRATEGY PILLAR 5: PRIVATE SECTOR PARTICIPATION IN ENERGY ACTIVITIES IN THE COUNTRY

Policy objectives

- Having private sector as a major actor in the development of the sector

Challenges

- Lack of strong private sector players in the energy sector
- Lack of the necessary capacity in terms of skills and resources for the existing local private sector players
- Challenges in securing the necessary financing required for developing the projects

Actions

6.5.1 DEVELOP LEGAL AND REGULATORY FRAMEWORK THAT ENSURES MEANINGFUL PARTICIPATION OF THE PRIVATE SECTOR IN STRATEGIC INVESTMENT IN THE COUNTRY

6.5.2 ESTABLISH CAPACITY BUILDING/TRAINING NEEDS AND DEVELOP THE TRAINING PLAN FOR LOCAL PRIVATE SECTOR PLAYERS IN THE ENERGY SECTOR

- Promote training and capacity building actions for local private sector to engage in energy activities
- Support academic and vocational institutions to come up with tailor made programs that shall assist the private sector nationals in different skills needed for undertaking energy related projects. This may include but not limited to the understanding of REs in depth. Preparation of business plans, basic engineering and designs for RE projects, etc
- Strengthen the ability of private sector to participate in state decisions and policy making process.
- Assist in establishing linkages between the local private sector and the potential foreign direct investors.

6.5.3 PUT IN PLACE ENABLING INVESTMENT ENVIRONMENT TO ATTRACT PRIVATE INVESTMENTS

- Prepare guidelines for accessing finances from local and international agencies to private sector firms interested to develop energy activities particularly in renewable energy and energy efficiency.
- Enforcing rules and regulations and providing enabling environment to facilitate the activities of private sector related to energy investments in the country.
- Develop standard Concessions, and Power Purchase Agreements to reduce time wastage in negotiations and transactions.
- Liaise with LEWA in coming up with known REFITs for both on- and off-grid solutions
- Aim at having atleast 50% of private investments run by nationals by 2022

- Enhance technology transfer and financing through facilitating partnerships between local actors in the sector and foreign potential investors for joint investments

6.6 ENERGY STRATEGY PILLAR 6: CIVIL SOCIETY PARTICIPATION IN ENERGY ACTIVITIES IN THE COUNTRY

Policy objective

- Having a vibrant and effective civil society organizations that are well conversant with the sector's development agenda
- Good collaboration between the Department of Energy and the civil society

Challenges

- Lack of sufficient sector skills by the civil society to enable active advocacy initiatives
- Lack of a well-defined and systematic partnership between the Department of Energy and the civil society in the country

Actions

6.6.1 ESTABLISH COLLABORATION MECHANISM WITH THE CIVIL SOCIETY ORGANISATIONS IN ADVANCING ADVOCACY ON EENERGY AGENDA IN THE COUNTRY

6.6.2 ESTABLISH CAPACITY BUILDING/TRAINING NEEDS AND DEVELOP THE TRAINING PLAN FOR CIVIL SOCIETY

- build capacity to civil society organizations already acting and wishing to engage in the sector

6.6.3 CREATE AN ENABLING ENVIRONMENT TO SHARE ENERGY INFORMATION WITH CIVIL SOCIETY

- share all the necessary information related to energy with civil society to leverage on their advocacy potential role with wider population in the country

6.6.4 FACILITATING PARTNERSHIPS BETWEEN LOCAL ACTORS IN THE SECTOR AND FOREIGN POTENTIAL NGOS INTERESTED IN THE SECTOR

- enhance technology transfer and financing through facilitating partnerships between local actors in the sector and foreign potential NGOs interested in the sector

6.7 ENERGY STRATEGY PILLAR 7: ENSURE GENDER MAINSTREAMING INCLUDING WOMEN, YOUTH AS WELL AS VULNERABLE GROUPS PARTICIPATION IN ENERGY RELATED ACTIVITIES

Policy objectives

- Women, youth and vulnerable groups dimension included in sector planning and initiatives

Challenges

- Lack of active participation of women, youth and vulnerable groups in energy planning

- Meagre energy skills base to allow active participation in development activities

Actions

- Build capacity of the women, youth and the Vulnerable groups, in energy related activities
- Ensure meaningful participation of women, youth and vulnerable groups in strategic decisions.
- Ensure gender mainstreaming in energy planning
- Promote employment creation and employability especially for youth, women and people with special needs
- Promote and support Small and Micro eco-innovative enterprises for Youth and women
- Come up with tailor made short training course and seminars related to small and medium enterprises that enable them create their own businesses
- Link them to the energy centres so that they may act as agents for energy business and trading
- Design deliberate strategic actions to increase participation of women in the energy sector
- Educate more women and youth as engineers, technicians and artisans in the field on energy sector, etc

6.8 ENERGY STRATEGY PILLAR 8: RESPONSE TO ENVIRONMENT AND CLIMATE CHANGE

6.8.1 OF RENEWABLE ENERGIES

Policy objectives

- To improve the energy security situation by reducing reliance on fossil fuels and imported electricity;
- To increase access to modern energy for rural and decentralized areas
- To reduce Greenhouse Gas (GHG) emissions from energy sector

Challenges

- Inadequate investments in clean environment and climate change responsive projects and programmes

Actions

- Aim at becoming a carbon neutral country through promotion of renewable energies
- Targeting all local generation through renewable energies as the source of electricity
- Promote the use of clean alternative energies for cooking and heating
- Ensure at least 70% of the population depending on biomass use efficient cook stoves by the year 2022
- Resource mobilisation targeting various environmental financing windows, protocols and agreements
- Improve efficiency of energy processes to reduce carbon emissions
- **Promoting Low Emissions Investment Plan (LEIP)**
  The Scaling Up Renewable Energy Programme (SREP) funded by World Bank will also create an enabling environment for private sector participation in the renewable energy sector. The SREP will assist Lesotho develop a Low Emissions Investment Plan, the plan will serve as the investment prospectus for renewable energies in Lesotho. The programme has engaged a consultant to develop LEIP, the plan has identified potential renewable energy projects for Lesotho as well as the options study report.

Project	Operation	Timeframe	Amount of CO_2
SMARDT: Carbon trading/Bread for the World	Improved Stoves	10 years	**Stoves: 12,500 Metric Tons** of CO_2: Volunteer Standard
Atmosfair gmbH/Solar Light on solar energy **Solar Light/DHL on Save80 Stove**	Solar lighting Improved efficient stoves prefabricated in Germany	Stoves: 5 years Solar: 7 years	**Stoves; 125,000** Metric Tons of CO_2: Fair Trade Carbon Credits **Solar:** 786 Metric Tons of CO2: Gold standard/CDM
TED	Anaerobic biogas production project	7 years	
Africa Clean Energy	Improved Stoves		

Table 10: Local and International NGOs investing in GHG mitigation Projects in Lesotho

❖ **Mapping of Renewable Energy Potential**

The project on the development of Renewable Energy Resource Map entails development of a hydrological map of Lesotho, useful to identify potential sites for power generation, development of a wind atlas for Lesotho, useful to identify specific sites with the most potential for wind energy generation and development of a solar radiation map, defining the different levels of radiation intensity over Lesotho, useful to localise sites for photovoltaic production;

The potential energy maps will be embedded in a GIS based tool containing further data suitable for the identification of sites which are promising for exploitation, such as network grid, roads, rivers/basins, land cover, population distribution.

❖ **Challenges in the renewable energy subsector**

- Over-reliance on biomass for energy especially for cooking and heating
- Lack of capacity to develop bankable projects in Res
- Inadequate access to the required investment financing

Proposed Actions

Challenge	Proposed intervention
Biomass Energy: High reliance on biomass energy: Declining biomass resources	❖ **A strategy that focuses on producing more biomass by improved forestry management** ▪ Encouraging and providing incentives to private forest plantations to use their wood for their own use or commercial purposes (the factories for tea and matches are good examples) ▪ Integrating tree planting into farm landscapes ▪ Strengthening the voluntary tree planting schemes especially in rural based communities

	▪ Encouraging Institutions (public and private) to establish their own woodlot schemes to provide fuel wood supply.
	❖ **A strategy that focuses on substituting more biomass with other energy sources that are environmental friendly;** ▪ Substitution by compressed and/or carbonized biomass briquettes: ▪ Substitution by Liquid Petroleum Gas (LPG) and paraffin: ▪ Substitution through the use of biogas and other bioenergy technologies: Promoting the use of bio digesters within households and institutions. The target is to deliver 300 bio digesters by 2022. Already, successful efforts are being registered by TED, a civil society organization in the country. ▪ Substitution by use of solar energy for lighting and water heating: ▪ Substitution by wind: Wind utilization as an alternative can easily provide power to communities where wind regimes are encouraging. And there are several places in the country with very encouraging wind speeds. ▪ Substitution by hydro power schemes:
Lack of energy efficiency strategy	Promote Demand Side Management Strategies and corresponding Technologies Government buildings and households, street lighting, water heating, etc.
Inadequate access to be financed by the consumers	Develop a sustainable financing mechanism for vulnerable people to access renewable energy technologies
	Establish incentives to encourage private investments in the sub-sector
	Establish cost reflective retail tariffs in order to have realistic and attractive feed-in-tariffs to investors
Inadequate capacity to install and maintain renewable technologies	Develop renewable energy capacity building programme with academia.

Table 11: Proposed solutions to Renewable Energy subsector

6.8.2 CLIMATE CHANGE RESPONSE THROUGH ENERGY MITIGATION AND ADAPTATION MEASURES:

The climate in Lesotho is characterized by droughts, floods, frosts, snow, hailstorms, whirlwinds and strong winds. Under climate change, the afore-mentioned conditions might get more pronounced and hence undermine sustainable development efforts. According to the Lesotho's Second National Communication, the Lesotho is likely to experience increase in temperatures, changes in rainfall patterns, increase in the rate of evaporation and increase in the intensity and frequency of extreme weather events. Climate change is expected to affect all sectors of the economy such as health, agriculture, environment, water and energy.

The energy sector has been identified under the Second National Communication to climate change as the second largest emitter of Green House Gas emission accounting to 31% of the Lesotho's total GHGs. Reduction of emissions in this sector will not only avoid levels of dangerous climate change but will shift the economy of the country towards a low carbon development path. Lesotho is a party to the United Nations

Framework Convention on Climate Change (UNFCCC) and is expected to meet the global objectives of the convention.

6.8.3 INTENDED NATIONALLY DETERMINED CONTRIBUTIONS (INDC)

The government of Lesotho developed the INDC in 2015 with an objective of addressing the UNFCCC Article 2 on contribution to stabilizing GHG concentrations in the atmosphere. The document has identified climate change mitigation measures under the energy sector as tabled below:

Mitigation Policy /Programs	**Targets & Assumptions**
Continued development of hydropower resources, particularly in terms of advancing technical design and sourcing funding for development of identified sites	❖ Improving energy efficiency by 20% by 2020, ❖ Increasing electricity coverage /access to 35% of households in 2015, 50% in 2020 and 80% by 2030; ❖ With increase in rural electrification, paraffin consumption is expected to come down from 30, 434 kilolitres (2014) to 25,000 kilolitres in 2020, with a GHG saving of 12 Gg CO2e and 20,000 kilolitres in 2030 with a GHG saving 24 Gg CO2e in the BAU. ❖ Potential reduction of transmission and distribution loses from 2015 until 2030 by 0.5% per annum (total of 7.5.0%) ❖ Increase renewable energy sources by 200 MW by 2020: 40MW from Solar (2017/2018); 35 MW from wind (2017); 125 MW from hydropower (2025)
Design and implementation of demand-side management techniques to encourage better use of existing distribution infrastructure, and Reduce peak demand.	
Promotion of renewable energy	
Improving distribution efficiency of the power system through measures to reduce transmission and distribution losses	
Continuing to develop and promote uptake of renewable sources of energy, particularly wind and solar (where feasible)	
Develop low energy investment plan	

Table 12: Climate change mitigation measures under the energy sector

6.9 STRATEGY PILLAR 9: PROMOTE RESEARCH AND DEVELOPMENT, INNOVATION AND TECHNOLOGY TRANSFER

Research and Development enables and enhances an in-depth understanding of the crucial role energy plays towards the economic growth. Innovative technological advancement is key in contributing towards realizing efficiency and cost effectiveness of energy undertakings. Actors in this domain therefore, need continuous engagement in research and development to enhance new and effective development of products and services in the energy sector. In order to match the global technological development trends, technology transfer and exchange of good practices is essential. This may involve North-South or South-South technology exchange and/or transfer. Renewable energy technologies that are advancing fast should be embedded into teaching programmes at all levels to encourage and grow the research and development culture in society.

Key Objectives

The key objectives are:

- Encourage embedding of energy related themes into research and development initiatives;

- Introduce incentives to encourage innovations related to energy in general and renewable energies in particular;
- Encourage participation at both technical and policy level in regional and international climate change related forums to enhance technology transfer and cooperation;

Key Challenges

The key challenges are:

- Inadequate inclusion of energy in general and renewable energies in particular in the existing research and development undertakings in the country;
- Limited cooperation amongst south-south and north-south on energy related initiatives;
- Inadequate innovations related to energy initiatives including services and products in the country;
- Inadequate relevant local entrepreneurial skills in energy sector.
- Technology development efforts have been hampered by the absence of a consolidated national energy strategy.

Key Actions

The main actions are:

- Introduce incentives for energy related innovations including relevant publications on energy in general and renewable energy in particular;
- Encourage research on different sustainable technologies that respond to energy challenges;
- Support research and development studies on energy;
- Encourage cooperation and collaboration with different actors in the sector on research and development as well as technology transfer where relevant

6.10 ENERGY STRATEGY PILLAR 10: RESOURCE MOBILIZATION

This pillar entails identification and establishment of financing mechanisms to facilitate the implementation of the energy policy and programmes.

Policy objectives

- ❖ Having capacity to fund energy projects especially those that cannot attract private financing
- ❖ Capability to finance rural electrification and other energy requirements in rural areas

Challenges

- ❖ Lack of the necessary capacity to mobilise the necessary financing for energy projects

6.10.1 CREATE ENERGY FUND

- ❖ Consolidate all energy related funds including the universal access fund, energy projects' supporting financing from the Petroleum fund, etc.
- ❖ Impose, collect and account for levies accrued from sale of energy services and products to finance energy programmes
- ❖ Ensure distribution entities collect and deposit repayment fees (surcharges) into a special fund dedicated for electrification
- ❖ Introduce a levy and create capital subsidy fund for enhancing affordability of energy services

6.10.2 ORGANIZE REGIONAL AND INTERNATIONAL INVESTMENT FORUMS TO ALLOW FOR ENERGY FOREIGN INVESTMENTS

- Prepare an investment prospectus
- Conduct annual or bi-annual international investment forums

6.11 ENERGY STRATEGY PILLAR 11: ENERGY MANAGEMENT INFORMATION SYSTEMS (EMIS)

This pillar puts in place the strategic actions to provide real-time information through development on EMIS and enable the department to make informed planning and decisions pertaining to the day to day operations of the Department.

Policy Objectives

- To increase the knowledge among Basotho of all available energy resources, technologies and their safety.
- To promote information dissemination and outreach in the of energy sector.
- To improve access to energy resource data and information.

Challenges

- Lack of baseline statistics that enable proper planning in the sector
- Lack of the necessary infrastructure and tools to establish effective data collection and management

Actions

- Maintain up to date Energy Data
- Collate existing, and develop new information dissemination programmes and conduct awareness campaigns on energy use
- Mainstream Energy issues into all levels of Education
- Conduct awareness campaigns throughout the country using different types of media such as radio adverts, training workshops and participating in the local fairs
- Disseminate updated energy data timely;

6.12 ENERGY STRATEGY PILLAR 12: REGIONAL INTEGRATION AND INTERNATIONAL COOPERATION

Policy objectives

- Leveraging the potential existing in the region for collaborative purposes
- Ease in learning from best practices existing in the region.
- Preparing the grounds for power trade

Challenges

- Lack of the necessary capacity and infrastructure to maximize benefits from the region

Actions

- Enhance regional and international collaborations through mutually benefiting initiatives and programmes

- ❖ Harmonise regulations and standards in order to allow for smooth power trade in terms of tariffs and compliant infrastructure arrangements
- ❖ Capacity exchange where relevant and necessary
- ❖ Shared networks where possible to allow for power trade but also networks' stability where needed.

CHAPTER 7: IMPLEMENTATION OF THE SUSTAINABLE ENERGY STRATEGY FRAMEWORK

7.1 IMPLEMENTATION FRAMEWORK BLOCKS

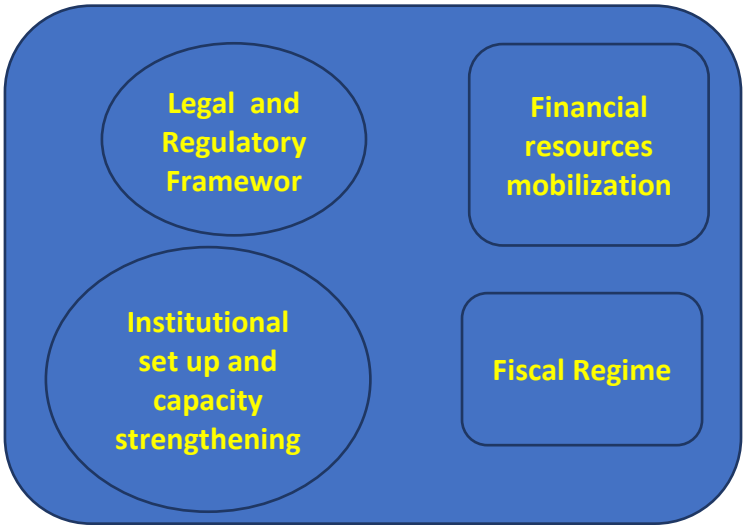


Figure 7: Key sector main areas of focus

For analytical purposes, four key focal areas are considered;

7.1.1 LEGAL AND REGULATORY FRAMEWORK

The legal and Regulatory framework constitutes mainly of the regulations and obligations pertaining to sector activities' execution including investments. It is of main importance that the legal and regulatory framework remains transparent and that the regulations' requirements and obligations are enforced. This pertains to several aspects including licensing for power generation and/or distribution and trading, tariff regulation, obligations related to the utilities and other energy service providers, etc.

7.1.2 THE FINANCIAL RESOURCES MOBILIZATION

The financial resources mobilization strategy aims at securing access to finance for energy (especially renewable energy) projects. This could take form of engaging the private sector participation, the public-private partnerships, establishment of revolving funds, favourable clean energy loans, direct subsidies, etc.

7.1.3 THE FISCAL REGIME

The fiscal regime would consist of the fiscal incentives in accordance with modern, clean and renewable energy policy focus. This could take form of for example CO_2 taxes, tax credits, institutional investor incentives, duty exemptions for RE equipment, VAT reductions, etc.

7.1.4 INSTITUTIONAL SET UP AND CAPACITY STRENGTHENING

The institutional framework aims to ensure the necessary institutional support to implement the energy strategy. This shall typically take the form of supportive agencies and institutions (governmental and non-governmental), academic and other educational institutions, information management and raising awareness, policy making and planning, training and organizational development, mobilization of resources,

7.2 PATH TO IMPLEMENTING THE STRATEGY

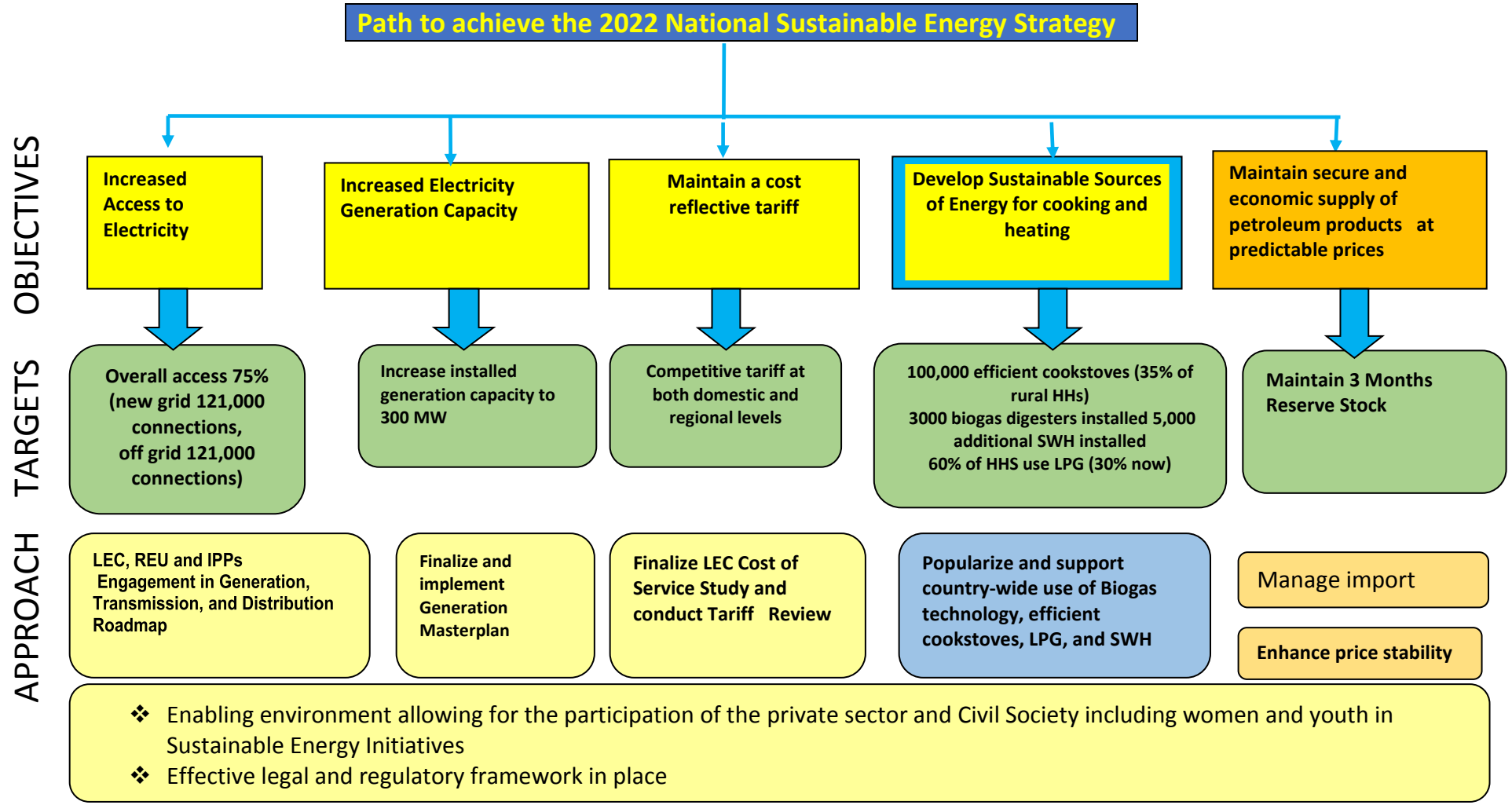


Figure 8: The roadmap to achieving the Sustainable Energy Strategy targets

CHAPTER 8: MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) is an important process for ensuring proper implementation of the project/program under consideration. Effective monitoring of the program is considered to be essential to tracking how effective the delivery of inputs, money and goods, is during Project implementation. The DoE shall ensure putting in place the M&E system and to ensure its effective execution of the Sustainable Energy Strategy. Variables to consider under M&E include development of an Energy management system that comprise setting targets and milestones, defining expected outcomes and indicators, development of effective reporting channels

8.1 ENERGY MANAGEMENT INFORMATION SYSTEM

The Department of Energy in collaboration with the Bureau of Statistics have embarked on energy data collection activity across all sectors of the economy. The energy survey is geared towards development of energy database that will be an effective tool to inform national policies and plans. The data collected will form part of an Energy Management system system looks at:

- Development of an energy sector baseline database,
- Maintenance of a comprehensive set of statistics on energy which will be useful for researchers and policy makers
- Designing and implementing a system of planning, monitoring and evaluation o he financial status and physical progress of energy projects
- Creating a system to give regular, comprehensive reports on the execution of the sustainable energy strategy 2018-22

8.2 REQUIREMENTS FOR COMPREHENSIVE SYSTEM OF M&E

An appropriate monitoring and evaluation system linked to the National development targets and should ensure that tracking of progress takes place and help inform future policy. Clear targets and indicators will help measure progress and can take a number of forms including the review of specific activities to ensure that they are having intended consequences. There are also more indirect forms of monitoring such as the development of a set of economic, social, and environmental indicators specifically crafted to represent the energy growth that Lesotho desires. Program and Projects performance will be monitored through the regular tracking of indicators and organized reviews related to the objectives of the Program. The performance analysis shall allow the management of the activities to make adjustments as necessary with a view of improving the overall impact of the Program support.

The Sustainable Energy Strategy pillars will be monitored through specified indicators linked with the sustainable development goals and national goals. The M&E system and tools shall reflect the indicators to be monitored including the goal indicators, objective indicators, outcome indicators and activity level indicators. The system plan shall also include timelines for measuring objectives, plans for establishing baselines and determining targets, when necessary, and frequency of measurement during the project/programme duration.

The indicator definition frame shall be prepared and shall provide a detailed definition of each indicator, unit of measure, source of data, methods and frequency of data collection, and entity responsible for such collection of data. The Program results will be measured through quantitative, objective and reliable indicators. Each indicator will have one or more expected results, i.e. targets, that include the expected time by which that result will be achieved.

- Defining the expected outcomes,
- Identifying/observing the monitoring indicators for final and intermediate outcomes, as well as outputs that contribute to achieving the outcomes,
- Ensuring that baseline data are available, and
- Targets/milestones are set to assess progress, and
- Making use of the EMIS to collect, analyze and report the data, and monitor progress.

The indicators will include sustainable development indicators such as percentage of population that has access to modern, clean and renewable energy and technologies, renewable energy share in the total energy consumption, energy intensity measured in terms of primary energy and GDP, employment created.

8.3 INSTITUTIONAL ROLES AND MANDATES

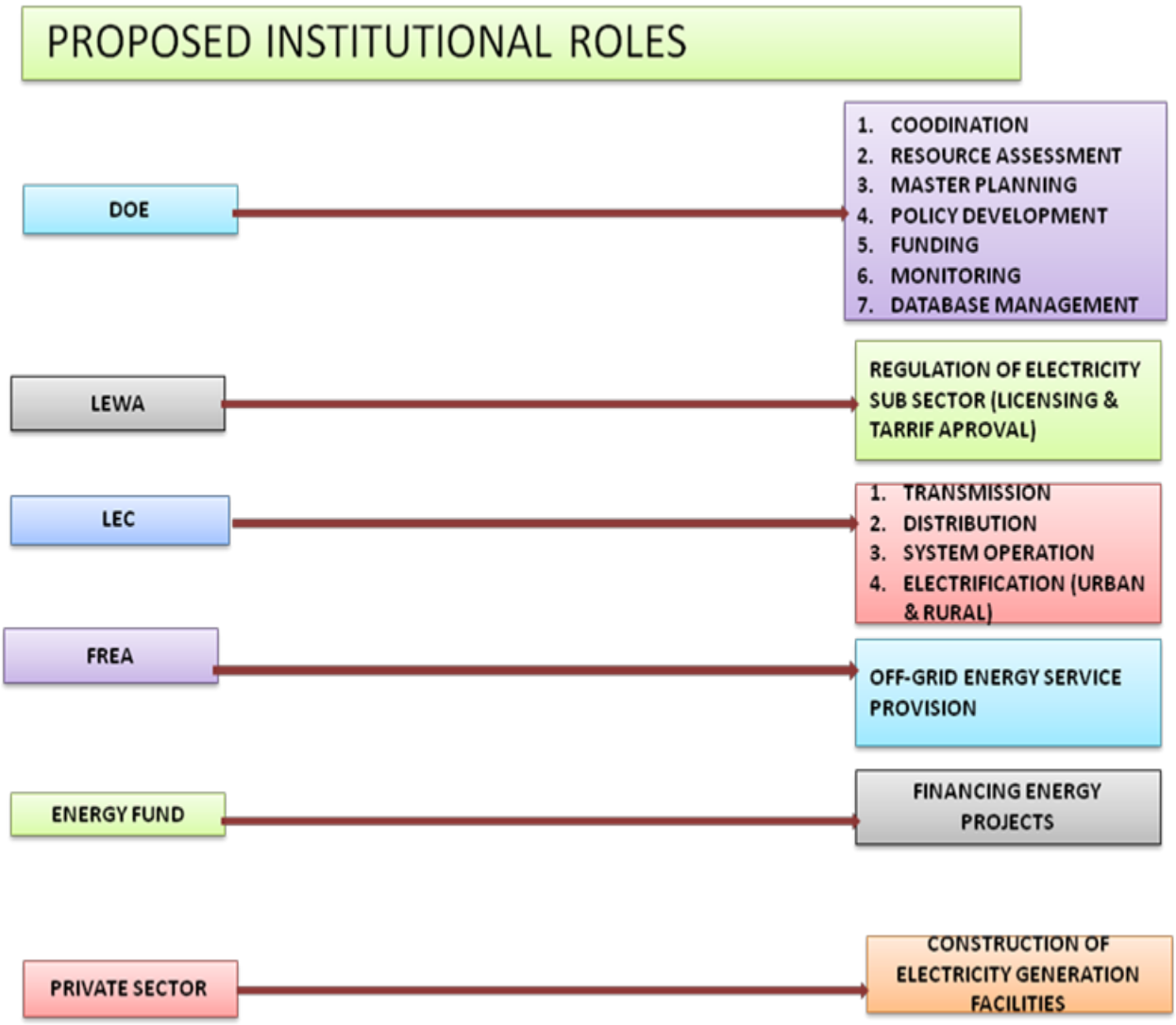


Figure 9: Roles and mandates of Energy Policy and Strategy Implementation Institutions
Source: Lesotho National Energy Policy document

CHAPTER 9: ANNEXES

Annex 1: Sustainable Energy Strategy Implementation Matrix/ Action Plan