



Figure 1: Energy profile of Lesotho



Energy Consumption and Production

In 2013, the population of Lesotho was 2.08 million (Table 1). In 2015, total electricity produced was 33 ktoe and all of it came from hydro sources (Table 2). Final consumption of electricity in the same year was 44 ktoe (AFREC, 2015). Figures 2 and 3 show the main energy statistics.

Table 1: Lesotho's key indicator

Key indicators	Amount
Population (million)	2.08
GDP (billion 2005 USD)	2.01
CO ₂ emission (Mt of CO ₂)	2.20

Source: (World Bank, 2015)

Energy Resources

Biomass

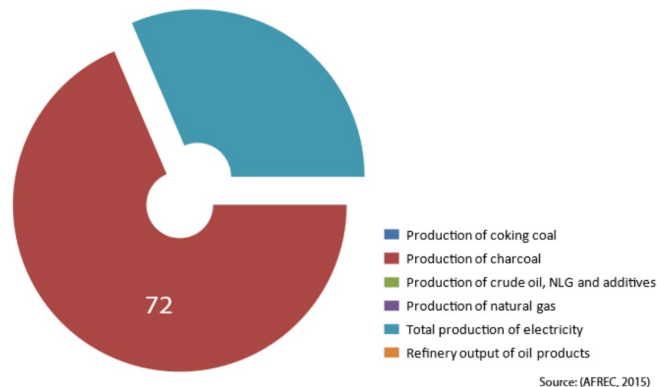
Lesotho, as is the case with many other African countries, relies heavily on biomass to supply domestic energy needs for the predominantly rural population. Further, since it does not produce any crude oil, there is an over dependence on imported fossil fuels. As a result its economy is vulnerable to fluctuating oil import prices (REEEP, 2012).

Hydropower

Hydroelectric power exists in abundance and contributes most of the country's electricity needs. The combined generation from the four small hydropower stations owned by the Lesotho Electricity Company is 3.25 MW. The Muela hydropower plant has a maximum nominal generating capacity of 72 MW. However, in periods of national maximum demand, the generation capacity may be stretched (flat-out) to just over 80 MW. On the other hand, economic growth and increased access has meant that during peak times, especially in the winter months, demand can be as high as 120 MW (REEEP, 2012).

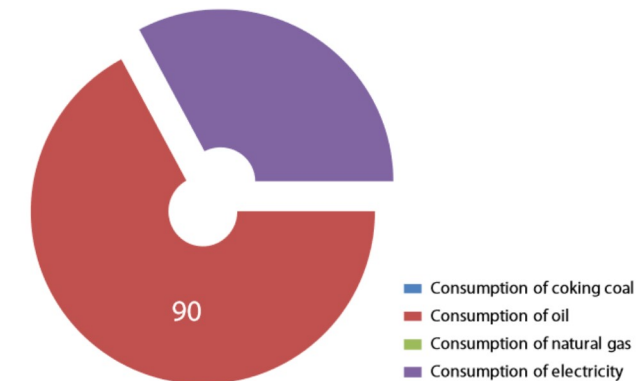
Renewable energy output from the Lesotho Highlands Power Project (LHPP) will be 6,000 MW from wind and 4,000 MW from hydro sources. This is equivalent to about 5 per cent of neighbouring South Africa's electricity needs. It is estimated that Lesotho's hydro generation potential is approximately 450 MW (REEEP, 2012). The Muela Hydropower Station has a combined generation capacity of 72 MW (often exceeded at a full capacity of 80 MW) with each of its three turbines generating 24 MW. This beneficial bi-product of the LHPP generally meets Lesotho's electricity requirements (LHWP 2009); when national demand exceeds the 72 MW operating limit, electricity often needs to be purchased from Eskom to compensate. The currently volatile energy supply situation in South Africa has on occasion affected Eskom's ability to honour export agreements, and there are times when Lesotho is unable to import the necessary electricity to refill its own supply.

Figure 2: Total energy production, (ktoe)



Source: (AFREC, 2015)

Figure 3: Total energy consumption, (ktoe)



Source: (AFREC, 2015)

Table 2: Total energy statistics (ktoe)

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	0	0	867	72
Production of crude oil, NLG and additives	-	-	-	-
Production of natural gas	-	-	-	-
Production of electricity from biofuels and waste	0	0	0	0
Production of electricity from fossil fuels	0	0	0	0
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	25	30	60	33
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	0	0
Total production of electricity	25	30	60	33
Refinery output of oil products	-	-	-	-
Final Consumption of coking coal	-	-	-	-
Final consumption of oil	70	75	186	90
Final consumption of natural gas	-	-	-	-
Final consumption of electricity	24	29	26	44
Consumption of oil in industry	0	0	0	0
Consumption of natural gas in industry	-	-	-	-
Consumption of electricity in industry	0	0	0	0
Consumption of coking coal in industry	-	-	-	-
Consumption of oil in transport	0	0	0	0
Consumption of electricity in transport	-	-	-	-
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-	-	-	-
Net imports of oil product	70	75	186	176
Net imports of natural gas	-	-	-	-
Net imports of electricity	1	1	10	19

- : Data not applicable

0 : Data not available

(P): Projected

(AFREC, 2015)

The second phase of the Lesotho Highlands Water Project (LHWP) will build a hydropower station with an installed capacity of between 1,000 MW and 1,200 MW and is proposed to be operational in 2018. About 200 MW of this will supply Lesotho's power needs, with the remaining power transmitted to South Africa.

In 2015, energy generated by the Lesotho Highlands Development Authority was 532,190 MWh from the Mohale dam (LHDA, 2016a); exports to South Africa in the same year were 4,408 MWh (LHDA, 2016b).

Oil and natural gas

Lesotho does not have any natural gas, oil or coal reserves. Net imports of oil product in 2015 amounted 176 ktoe (AFREC, 2015).

Peat

The country has 100 km² of peatlands (WEC, 2013).

Wind

With less than 20 per cent of the country lying below 1,800 m above sea level, there are technically a huge number potential sites where wind power can be generated. Currently, three sites being investigated—near Katse Dam, Mohale Dam and Mphaki in the south of Lesotho (REEEP, 2012). A wind farm at Letseng in the Maluti-Drakensberg area proposed by a South African-Lesotho joint venture is on course for development despite concerns regarding the conflict between vulture conservation and the wind energy industry. This location is important for the ecology of the Bearded and Cape Vultures as it contains some of their breeding and foraging

grounds and bird collisions with wind turbines is an emerging ecological issue.

Solar

The implementation of solar in Lesotho is being championed by the Lesotho Solar Energy Society (LESES). Installers and dealers are registered with the LESES and this enables the implementation and enforcement of regulations and standards (REEEP, 2012). Renewables are a priority in the Energy Policy 2015-2025. Specific targets include promoting solar in the design of new buildings and phasing out energy intensive items in old buildings such as electrical geysers and replacing them with solar water heating. The Rural Electrification Master Plan aims to increase access to electricity by encouraging the uptake of solar.

Tracking progress towards sustainable energy for all (SE4All)

Lesotho has one of the lowest electrification rates in Africa. In 2010, only 17 per cent of the population had access to electricity increasing to 20.6 per cent in 2012 (Table 3). Most access is concentrated in the urban and growth centers where transmission and distribution infrastructure services are relatively well developed. About 10.2 per cent of the area serviced by the grid is defined as rural, increasing to 47 per cent in the urban areas (World Bank, 2015); (World Bank, 2016).

Most households generally use a combination of energy sources for cooking that can be categorized as follows: 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). Electricity is mainly used for lighting (REEEP, 2012). Access to non-solid fuels in 2012 was 38.02 per cent with 19 per cent in rural areas and 93 per cent in urban areas (World Bank, 2015).

Lesotho's energy intensity increased at a compound annual growth rate (CAGR) of 2.64 over the 20 years between 1990 and 2010; and at -2.81 CAGR from 2010 to 2012. The rate of increase during the period 2000-2010 was 4.89 per cent compared to 0.44 per cent between 1990 and 2000 (World Bank, 2015).

Between 2010 and 2012, the economy's energy intensity (the ratio of the quantity of energy consumption per unit of economic output) increased from 11.6 MJ to 11.0 MJ per US dollar (2005 dollars at PPP) (World Bank, 2015).

The share of renewable energy in total final energy consumption (TFEC) decreased from 100 to 40.5 per cent between 2010 and 2012. Traditional biofuels form the biggest share of renewable sources at 35.2

Table 3: Lesotho's progress towards achieving SDG7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Target	Indicators	Year					
		1990	2000	2010	2012	2000-2010	2011-2015
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Per cent of population with access to electricity	6	5	17	21		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	36	39	38	38.02		
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption		100.0	100.0	40.5		
7.3 By 2030, Double the rate of improvement of energy efficiency	7.3.1 GDP per unit of energy use (constant 2011 PPP \$ per kg of oil equivalent)				200.37 (2007)		
	Level of primary energy intensity(MJ/\$2005 PPP)	6.9		11.6	11.0	11.07	10.96

Sources: (World Bank, 2015); (World Bank, 2016)

Figure 4: SDG indicators





Percentage of population with access to electricity	Access to non-solid fuel (% of population)	GDP per unit of energy use (PPP \$ per kg of oil equivalent) 2013	Renewable energy consumption (% of total final energy consumption), 2006-2011, 2012
20.6%	38.02%	18.87	4.24%
			

Table 4: Lesotho's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)

INDC
*Continue the development of hydropower resources, particularly in terms of advancing technical design and sourcing funding for development of identified sites.
*Design and implement demand-side management techniques to encourage better use of existing distribution infrastructure, and reduce peak demands.
*Promote renewable energy.
*Improve distribution efficiency of the power system through measures that reduce transmission and distribution losses.
*Continue to develop and promote uptake of renewable sources of energy, particularly wind and solar (where feasible).
*Develop a low-energy investment plan.
*Improve energy efficiency by 20 per cent by 2020.
*Increase electricity coverage /access to 35 per cent of households in 2015, 50 per cent in 2020 and 80 per cent by 2030.
*Reduce, paraffin consumption from 30, 434 kilolitres (2014) to 25,000 kilolitres in 2020, with a GHG saving of 12 Gg CO ₂ eq and 20,000 kilolitres in 2030 with a GHG saving 24 Gg CO ₂ eq in the BAU.
*Adopt potential reduction of transmission and distribution losses from 2015 until 2030 by 0.5 per cent per annum (total of 7.5 per cent).
*Increase renewable energy sources by 200 MW by 2020: 4 0MW from solar (2017/2018); 35 MW from wind (2017); and 125 MW from hydropower (2025).

Source: (MEM, 2015)

Table 5: Lesotho's institutional and legal framework

Basic Elements	Response
Presence of an Enabling Institutional Framework for sustainable energy development and services (Max 5 institutions) most critical ones	Ministry of Energy Affairs - technical
Ministry of Natural Resources - policy	
Presence of a Functional Energy Regulator	Lesotho Electricity Authority
Ownership of sectoral resources and markets (Electricity/ power market; liquid fuels and gas market)	
Level of participation in regional energy infrastructure (Power Pools) and institutional arrangements	Southern Africa Power Pool
Environment for Private Sector Participation	
Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)	<ul style="list-style-type: none"> • Lesotho Electricity Generation Authority (LEGA) • Lesotho Highlands Development Authority • Lesotho Electricity Company (LEC) • Lesotho Electrification Unit (LEU)
Where oil and gas production exists, whether upstream services and operations are privatized or state-owned, or a mixture (extent) e.g., licensed private exploration and development companies)	
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	BP, Total, Chevron, Shell and Engen
Presence of Functional (Feed in Tariffs) FIT systems	No
Presence Functional IPPs and their contribution	PowerNET Developments (Pty) Ltd
Legal, Policy and Strategy Frameworks	
Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones	<ul style="list-style-type: none"> • Energy Policy 2015-2025 • National Rural Electrification Fund (NREF)
Current enabling laws/pieces of legislation (including: RE; EE; private sector participation; & PPPs facilitation) – including electricity/grid codes & oil codes (5 max or yes/no) most critical ones	<ul style="list-style-type: none"> • Lesotho Electricity Authority Act of 2002 • Lesotho Electricity Authority Amendment Act 2011 • Lesotho Highlands Development Authority (Amendment) Act 2000

This table was compiled with material from (REEEP, 2012), (LEWA, 2016) and (Tsehlo, 2012)

per cent of TFEC in 2012 (World Bank, 2015). Renewable sources contributed 100 per cent of the share of electricity capacity in 2012 (World Bank, 2015).

Intended Nationally Determined Contributions (INDC) within the framework of the Paris climate Agreement

Under the Lesotho Energy Policy 2015 and Draft Lesotho Renewable Energy Policy 2013, the government's long-term plan is to increase energy efficiency and use more climate friendly technologies to supply energy. This vision is reflected in the energy-related Intended Nationally Determined Contributions (INDC), which are highlighted in Table 4.

Institutional and Legal Framework

The Ministry of Energy Affairs is in charge of the energy sector. The energy regulator is Lesotho Electricity Authority. Lesotho Electricity Company (LEC) is the monopoly transmitter, distributor and supplier of electricity, while the Lesotho Highlands Development Authority (LHDA) is the main generator of electricity from the Muela Hydro Power Station. On a regional level, Lesotho is a member of the Southern Africa Power Pool. The legal framework is provided by the Lesotho Electricity Authority Act of 2002 (Table 5).

The main sector policy is the 2015-2025 Energy Policy. It aims to increase energy access by increasing reliability and affordability. Ultimately this will improve livelihoods, promote economic growth and investment, ensure energy security and contribute to environmental protection including climate change (KOL, Undated).