Empowered lives.
Resilient nations.

United Nations Development Programme

Country: Lesotho

PROJECT DOCUMENT

Project Title: Development of Cornerstone Public Policies and Institutional Capacities to accelerate Sustainable Energy for All (SE4All) Progress.

UNDAF Outcome(s): Outcome 2: By 2017 Lesotho adopts environmental management practices that promote a low-carbon, climate-resilient economy and society, sustainably manages natural resources and reduces vulnerability to disasters.

UNDP Strategic Plan Primary Outcome: Outcome 5: Countries are able to reduce the likelihood of conflict, and lower the risk of natural disasters, including from climate change.

UNDP Strategic Plan Secondary Outcome: Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded.

Expected CP Outcomes: Outcome 2: By 2017, Lesotho adopts environmental management practices that promote a low-carbon, climate-resilient economy and society, sustainably manages natural resources and reduces vulnerability to disasters.

Expected CPAP Outputs: (i) Number of national/sectoral policies and strategies that promote low-carbon, climate-resilient economy and society; (ii) Number of national/sectoral policies that promote conservation of natural resources; and (iii) Number of local communities that implement disaster risk reduction measures.

Executing Entity/Implementing Partner: Ministry of Energy and Meteorology (MEM).

Implementing Entity/Responsible Partners: United Nations Development Programme (UNDP).

Brief Description

To catalyse investments in renewable energy-based mini-grids and Energy Centres to reduce GHG emissions and contribute to the achievement of Lesotho's Vision 2020 and SE4All goals. It will do so by leveraging $22,767,837 in multilateral and private sector financing over the project/immediate post-project implementation period. Over the same period, 60 villages will be energised through the utilisation of renewable energy technologies and 20 Energy Centres will be established to each service at least 5 surrounding villages. Energisation of the 60 villages and establishment of the 20 Energy Centres villages will result in a total of 213,680 tonnes of CO_2 being abated during the project/immediate post-project period, resulting in a direct abatement cost of $ 16/tonne of CO_2. The project will achieve this target by introducing a conducive regulatory framework and by establishing a financial support scheme that together will facilitate private sector participation in village energisation through renewable energy mini-grids and establishment of Energy Centres in the country.

Programme Period:	2013-2017
Atlas Award ID:	00082649
Project ID:	00091460
PIMS #	5367
Start date:	August 2016
End Date:	July 2021
Management Arrangements:	NIM
PAC Meeting Date:	

Total resources required (total project funds)	$ 22,767,837
Regular (UNDP TRAC)	$400,000
GEF	$3,500,000
Other (partner managed sources)	
• Private Sector (Cash - Bethel)	$2,000,000
• Private Sector (in-Kind -LSES)	500,000
• Government (Cash)	$8,467,837
• European Union	$7,900,000

Agreed by (Government): PS: Ministry of Development Planning

Date/Month/Year

Agreed by (Executing Entity/Implementing Partner): PS: Ministry of Energy and Meteorology

Date/Month/Year

Agreed by (UNDP):

Date/Month/Year

Table of Contents

LIST OF ACRONYMS

AAP	Africa Adaptation Programme
AfDB	African Development Bank
APR	Annual Project Review
BoS	Bureau of Statistics
CO	UNDP Country Office
CO_2	Carbon dioxide
DoE	Department of Energy
DSQA	Department of Standards and Quality Assurance
EC	Energy Centre
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FSS	Financial Support Scheme
GEF	Global Environment Facility
GHG	Greenhouse Gas
IPP	Independent Power Producer
kW	Kilowatt
kWh	Kilowatt-hour
LEC	Lesotho Electricity Company
LED	Light-Emitting Diode
LEWA	Lesotho Electricity and Water Authority
LHDA	Lesotho Highlands Development Authority
M&E	Monitoring and Evaluation
MEM	Ministry of Energy and Meteorology
Mtoe	Million tonnes of oil equivalent
MW	Megawatt
MWh	Megawatt-hour
NAPA	National Adaptation Programme of Action
NGO	Non-Governmental Organisation
NSDP	National Strategic Development Plan
NUL	National University of Lesotho
QPR	Quarterly Progress Report
PIF	Project Identification Form
PIR	Project Implementation Review
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPG	Project Preparation Grant
REU	Rural Electrification Unit
RSC	UNDP Regional Service Centre

SE4All	Sustainable Energy for All
SREP	Scaling-up Renewable Energy in Low Income Countries Programme
toe	Tonnes of oil equivalent
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
$	United States dollar[1]

[1] Exchange Rate: 1 $ = 12.72 Maloti (LSL)

1. SITUATION ANALYSIS

The Kingdom of Lesotho is a landlocked country, completely surrounded by South Africa, with an area of 30,355 square kilometres (approximately 11,720 square miles). The country has common borders with three of South Africa's provinces, namely, the Free State in the west and north, the Eastern Cape in the south, and Kwazulu-Natal in the east. The landscape is mountainous and rugged with elevations from 1,388 m to 3,482 m and extremely challenging for development – because of its topography, the country is often referred to as the "Mountain Kingdom". Arable land is limited and less than 10% of the country is presently under cultivation. Lesotho is segregated into four (4) distinct agro-ecological zones/regions, namely, the Lowlands (17%), Foothills (15%), Mountains (59%) and Senqu (Orange) River Valley (9%). These zones are characterized by significant climatic and ecological differences. The geo-morphological and topographic conditions have largely confined favourable socio-economic conditions to the lowlands, the foothills and the Senqu River Valley, leaving the mostly barren and rugged mountain region mainly for grazing.

The climate of Lesotho is generally classified as temperate with alpine characteristics; the country experiences hot summers and relatively very cold winters by the African continent standards. Air temperatures tend to be lower than in other countries at similar latitudes mainly due to greater elevation above mean sea level. The main characteristics of the country's climate are that it has four distinct seasons, huge fluctuations in temperature and erratic rainfall. Studies by the IPCC and Lesotho Meteorological Services suggest that probable climate change scenarios for Lesotho include increasing temperatures, changes in rainfall patterns, decreasing summer precipitation, and increasing intensity and frequency of extreme weather events. The capital, Maseru, and its surrounding lowlands often reach 30°C in summer. Winters can be extremely cold with the lowlands getting down to −7° C and the highlands to −18° C at times. The highlands areas experience severe winters with ground frost of up to 150 days per year and such conditions limit the scope of crop production and biodiversity. Snow is common between May and September, with heavy snowfalls that often cut off the population from basic health services and food supplies. The mean summer temperature is about 25° C and the mean winter temperate about 15° C. The annual precipitation varies between about 450 millimetres in the Senqu River Valley to about 1,200 millimetres in areas of the northern and eastern escarpment bordering South Africa.

At the time of the last census (2006 – the next census will be in 2016), the "de Jure" population of Lesotho amounted to 1,894,194 (Source: Bureau of Statistics website) with an annual growth rate of 0.08 percent; as per the World Bank, the estimated population in July 2014 was 1,942,008. This implied an annual growth rate of 0.34 percent. Even though Lesotho is a relatively small country, two-thirds of the country is sparsely inhabited, comprised of rugged mountains and deep valleys with small, scattered villages on mountain sides. The population distribution of Lesotho is 24 % urban and 76 % rural. However, it is estimated that the annual increase of urban population is 3.5%, resulting from migration from the rural areas. Population density is lower in the highlands than in the western lowlands. Regarding the age structure, about 33.5 % of the population is less than 15 years old, 61.1 % is aged 15-64 years, while 5.4 % is 65 years and older.

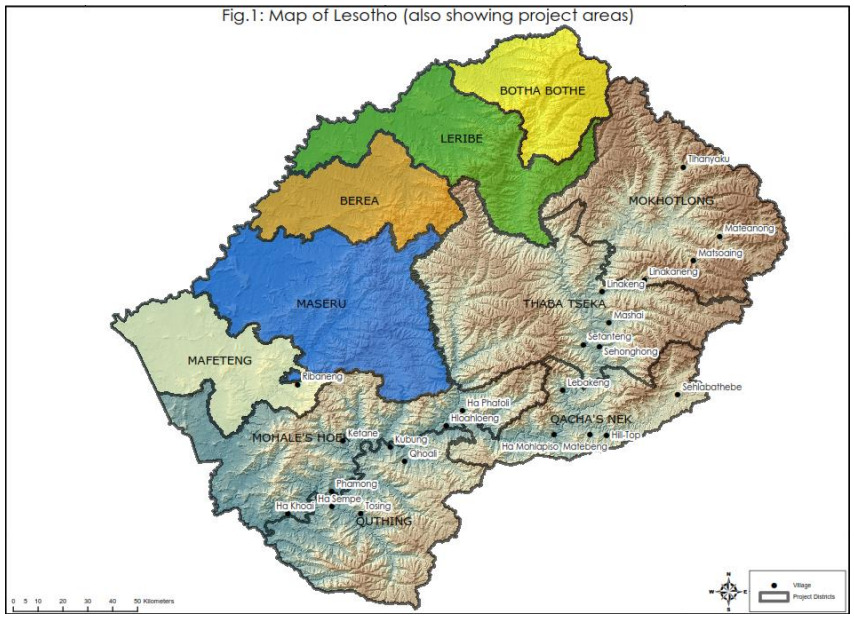


Fig. 1: Map of Lesotho

Lesotho's economy is based on water (sold to South Africa), light manufacturing (textile, clothing and leather), customs duties from the Southern African Customs Union (SACU), agriculture (wool, mohair and livestock), diamond mining and stone quarrying, and to some extent, remittances from Basotho (people of Lesotho) working in South Africa. The majority of households subsist on farming or migrant labour and almost 50% of the population earns some income through small-scale crop cultivation or animal husbandry, although recurrent drought has decreased agricultural activity. Lesotho's economy remains intricately linked to that of its regional and international partners, especially South Africa. Revenue from the Southern African Customs Union (SACU), which forms a significant portion of the Government's budget, has lately decreased by 56% due to the volatile nature of these resources. The government has responded by strengthening its tax system to reduce dependency on customs duties. As demand for migrant labour by the South African market declined and unemployed migrant workers returned to Lesotho, remittances shrank from about 60% of gross domestic product (GDP) in the 1980s to about 20% in 2005 and just over 19% in 2013 (Source: Central Bank of Lesotho). This constituted a huge strain on the country's economy. Despite Lesotho's market-based economy being heavily tied to its neighbour South Africa, trade with other global partners remains critical.

The U.S. is an important trade partner because of Lesotho's heavy dependence on apparel exports. Such exports have grown significantly in view of the trade benefits embodied in the Africa Growth and Opportunity Act. With 57.3% of the population living in poverty (MDG Report, 2013), Lesotho signed in March 2001 an Interim Poverty Reduction and Growth Facility Credit in the amount of $ 32 million with the IMF to support the nation's economic and structural reform programme. In July 2007, Lesotho also signed a Millennium Challenge Account Compact with the U.S. worth $362.5 million to support market-oriented measures designed to open its economy to competition, fight corruption and encourage transparent business dealings.

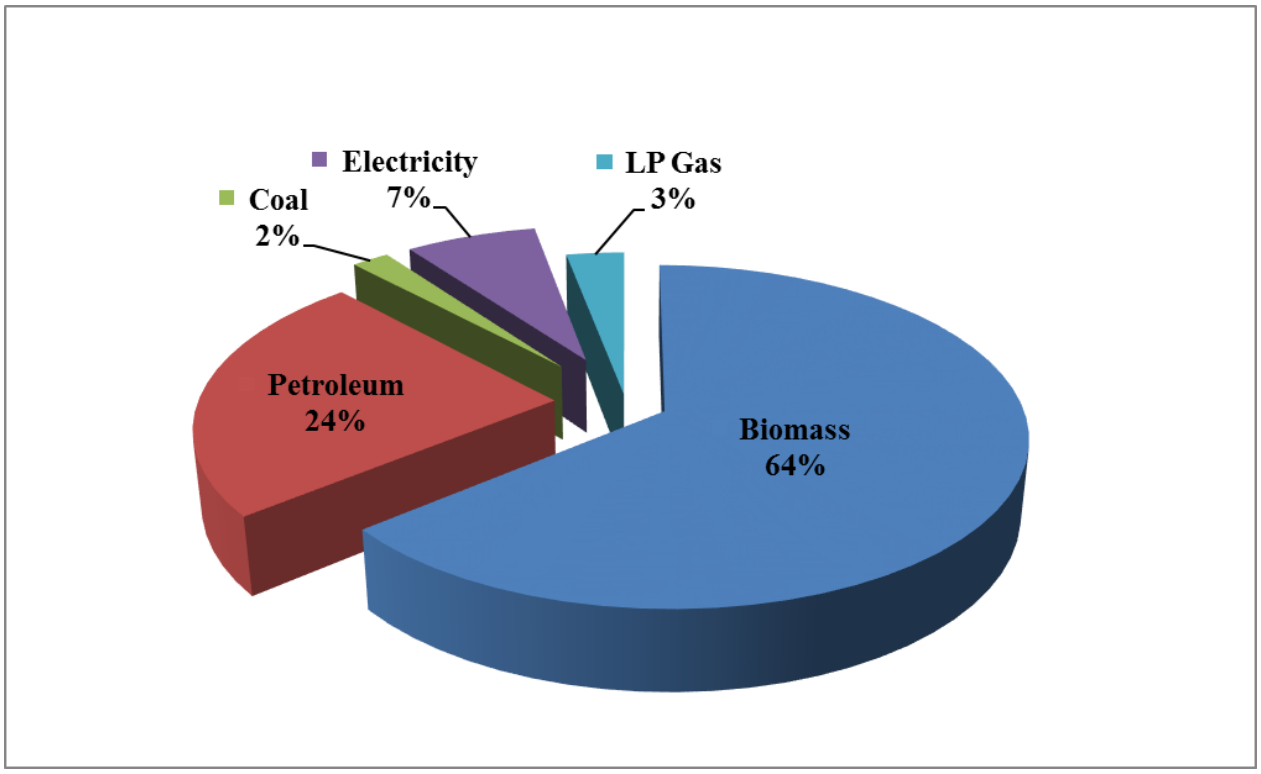
Economic growth declined from about 4.4% in 2008 to 1.9% in 2009, due mainly to the effects of the global economic crisis, as demand for the country's exports declined and SACU revenue fell precipitously when South Africa - the primary contributor to the SACU revenue pool - went into recession. As the global economy began to recover, however, Lesotho's gross domestic product (GDP) in 2010 grew by an estimated 5.6%. With a per capita income of $ 1,715 in 2013, the country is classified as a Least Developed Country (LDC) and is positioned at 158 out of 186 countries as per the Human Development Index for 2013.

Lesotho does not possess any indigenous sources of oil, coal, or natural gas and has no oil refinery, with the result that it is totally dependent on imported fossil fuels (all petroleum products, including kerosene (paraffin) , jet fuel and gasoline) for its energy requirements in the transportation and industrial sectors. As per the 2009-2011 Energy Balance Report issued by the Bureau of Statistics in 2013, the country imported the equivalent of 2,000 barrels (317,975 litres) of oil/day. Demand for imported petroleum products has been on the rise, increasing from 163.8 million litres in 2006 to 217.7 million litres in 2010 and to 225.3 million litres in 2014.

Industry is the biggest electricity consumer at 35% followed by the domestic sector (households) at 32%. The annual per capita electricity consumption is 253 kWh, significantly below the African average of 579 kWh and the world average of 2,777 kWh. The household electrification rate is 30%, with 36% of urban/peri-urban households and only 8.65% of rural households having access to electricity services (Source: DoE, December 2014). Electricity, however, only accounted for 7% of the consumed energy in Lesotho in 2014 (Fig 2)[2].

Biomass, although limited in supply, forms an important energy source in the rural household sector. Approximately 60% of households in the country use biomass for heating and cooking, and 95% use paraffin (kerosene) or candles for

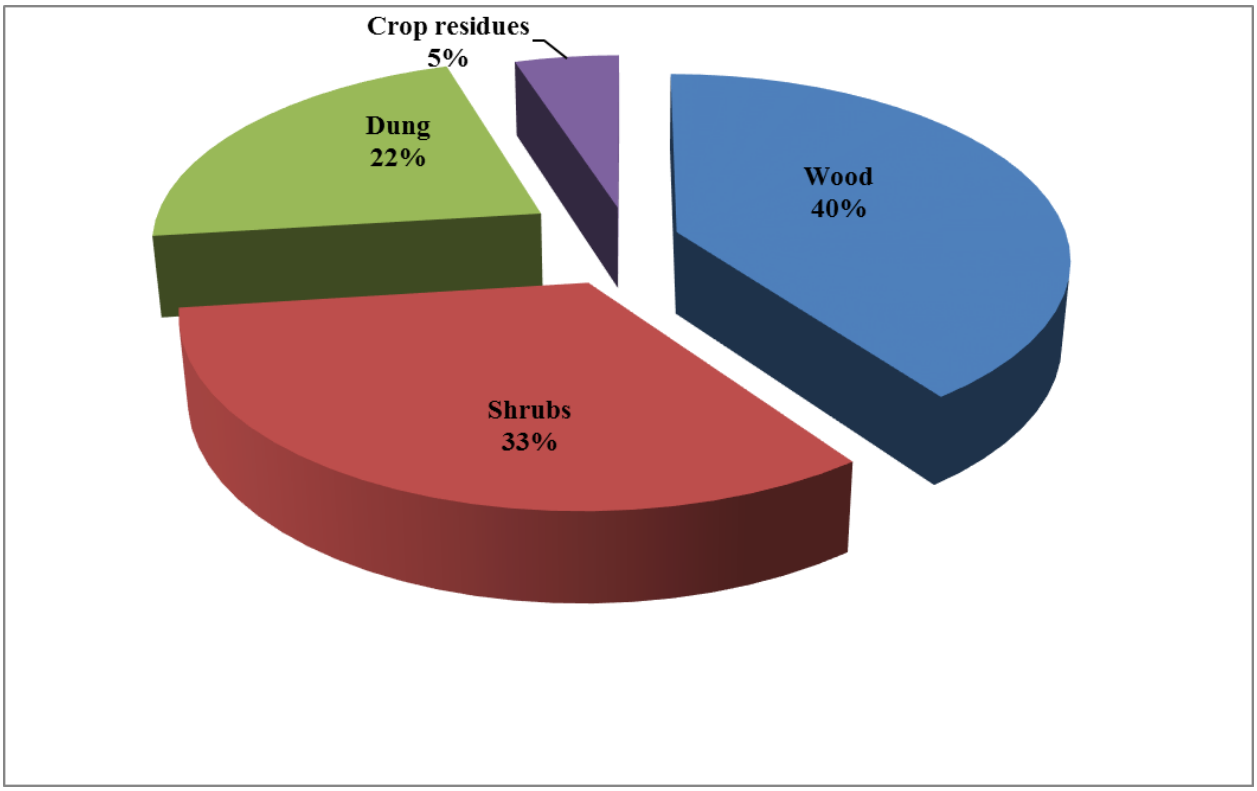
[2] All 2014 consumption figures are "estimates" based on consumption for prior years and are subject to confirmation when official figures are released.



Source: Extrapolation of data from DoE (2009 Energy Balance), BoS (2011 Lesotho Demographic Survey) and LREBRE reports.

Fig. 2: National Energy Consumption (2014)

lighting. Biomass accounts for 72% of the households' consumption and about three quarters of their total energy demand is met by biomass in the form of wood, shrubs, animal dung and agricultural residues (Fig 3). The total primary energy supply for Lesotho (37.2 Peta Joules or 37.2×10^{15} Joules in 2014) is dominated by traditional biomass (wood, crop waste and dung) with its share representing 66%. Modern forms of energy, such as petroleum products, coal, electricity and LPG, constitute the remaining 34%, the demand for which has been on the rise, as indicated above.



Source: Extrapolation of data from DoE (2009 Energy Balance), BoS (2011 Lesotho Demographic Survey) and LREBRE reports.

Fig 3: Biomass consumption in the rural household sector, 2014.

Lesotho has good renewable energy resources. The hydro power potential is estimated at slightly over 14,000 MW, inclusive of the 22 mini-hydropower sites. It also has good solar energy resources with over 300 sunny days a year and average insolation levels of 5.25 – 5.53 kWh/m^2/year. In addition, the country has good wind energy resources, with measured annual average wind speeds of 3.7 to 4.7 m/s at 10 m height at some locations. Thus, renewable energy sources have the potential to play an increased role in the country's energy mix, potentially being used to displace imported fuels for isolated grid-electricity generation.

The Government is cognisant of the fact that it is an unsurmountable task to serve the un-electrified 91.35% of the country's rural population through grid extension, because of the very high costs (between $ 20,000 to $ 30,000/km; Source: LEC, 2015) associated with the construction of electricity distribution lines in a mountainous terrain; for comparison purposes, these costs run from $ 13,000 to $ 19,000/km of line in Kenya, Senegal or Mali. In addition, simply trying to do this at the present time would add to more electricity being imported from South Africa/Mozambique, unless massive investments are made in developing the country's abundance of hydropower resources. Consequently, there is a keen awareness among decision makers of the need to shift towards more decentralised, sustainable and modern forms of energy for the much dispersed rural areas in terms of cooking, lighting and heating during the winter months. Hence, within the context of the United Nations Sustainable Energy for All Initiative, the Government proposes to utilise the abundance of solar energy in the country and wind/hydro resources, where available, to meet the energy needs of the rural communities. Suffice it to mention that the 3 objectives of the Sustainable Energy for All Initiative are to ensure universal access to modern energy services, double the rate of improvement in energy efficiency and double the share of renewable energy in the global energy mix by 2030. Thus, the transformation of the rural energy sector to an economically viable and environmentally friendly system requires a comprehensive and multi-faceted approach in the design of appropriate policy and planning frameworks, and incentives to fully integrate renewable energy technologies into the country's energy mix.

The "Rapid Assessment and Gap Analysis" that the Government undertook in June 2012, with the support of UNDP under the Sustainable Energy for All Initiative, identified the following key gaps/barriers that need to be addressed in order to achieve the objectives of the Initiative:

- Absence of an approved policy and strategy for energy, renewable energy and energy efficiency promotion.
- Lack of data for proper analysis of the energy sector.
- Fragmented institutional, legal and regulatory framework.
- Lack of private investment in modern energy supplies and technologies for cooking and other thermal applications.
- Barriers to private investment in new on-grid and off-grid power generation capacity (especially for Renewable Energy Systems), grid extension/maintenance, demand-side management (DSM) and energy efficiency.
- Barriers to private investment in modern energy for productive and socio-economic uses with a focus on energy efficiency and renewable energy technologies and solutions.

Again, within the context of the Sustainable Energy for All Initiative, the European Union undertook an exercise in 2014 to scope for "Potential Interventions in the Energy Sector under 11th European Development Fund (EDF) in Lesotho" that will commence implementation later in 2015 or in early 2016. The Final Report issued in December 2014 identifies under the heading "Energy Access for the Rural Areas" the following 2 interventions under the 11th EDF, viz. Efficient cook stoves with lighting kits/battery charging and Isolated mini-grids.

1.1 STAKEHOLDER ANALYSIS AND INSTITUTIONAL FRAMEWORK

The Ministry of Energy and Meteorology (MEM) (Fig. 4) (MEM was until 28 March 2015 known as Ministry of Energy, Meteorology and Water Affairs - MEMWA) is responsible for policy issues in the field of energy in the country, with energy matters directly under the responsibility of the Department of Energy (DoE). As such, DoE is responsible for policy development, setting policy goals, targets for implementers, inter-ministerial coordination, energy data management, oversight for energy imports, etc.

The institutions described below are directly relevant to the present project and operate under the purview of MEM through DoE:

- **Lesotho Highlands Development Authority (LHDA):** LHDA was established in 1986 to manage the Lesotho Highlands Water Project (LHWP) designed "to capture, store and transfer water to South Africa". To achieve this, the Katse Dam, situated on the Malibamatšo River (a tributary of the Senqu River) was built and this provided the country with the opportunity to simultaneously utilise the dam facilities for electricity generation. This resulted in the construction of the Muela Hydropower Station (water flows through a 45-km tunnel from the Katse dam to Muela) with a design capacity of 72 MW and it became operational in 1998. LHDA also operates a 500-kW mini-hydropower plant at Muela to supply the village built around the power station; the village comprises housing for power station staff, a police station, post-office, stores, etc.

  Electricity generated by LHDA from the 72 MW Muela Hydropower Station is already insufficient to meet the demand in summer that can go up to 90 MW. However, in winter, the demand for electricity almost doubles (in 2013, the peak demand was 145 MW) and this results in LEC (see below) importing electricity from the Southern African Power Pool (SAPP) to meet the demand. Electricity imports from SAPP come from ESKOM (South Africa) where 77% of electricity generation is coal-based, thus GHG intensive, and EdM (Electricidade de Moçambique – from the Cahora Bassa hydropower station) through wheeling, in the latter case, across the ESKOM grid. In 2014, for example, Muela generated 500 GWh (71% of the total consumed in-country during that year, while 114 GWh and 91 GWh were imported from ESKOM and EdM, respectively.

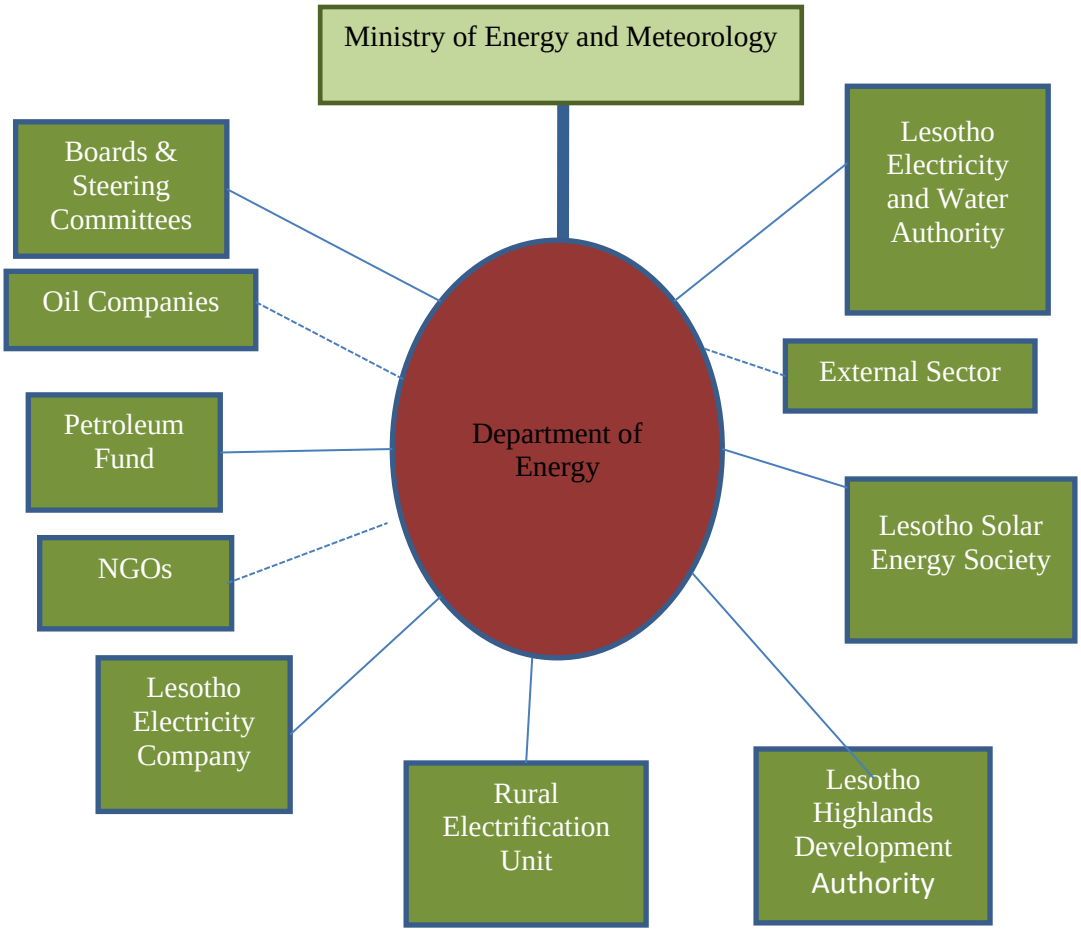


Fig. 4: Ministry of Energy and Meteorology Organisational Chart

LHDA generates electricity at 1.1 US Cents/kWh, while the purchase price from South Africa is 7.2 US Cents/kWh and 12 US Cents/kWh from Mozambique, including wheeling charges – purchase from EdM is resorted to when ESKOM is unable to meet the totality of Lesotho's needs during the winter months. This electricity is then sold to the Lesotho Electricity Company for transmission and distribution to consumers in several districts.

- **Lesotho Electricity Company (LEC):** LEC was established in 1969 to transmit, distribute and supply electricity in the urban and peri-urban areas of the country. Between 1983 and 1993, it constructed 4 small/mini-hydropower stations, with only the recently-rehabilitated 2 MW plant near Mantšonyane (with an estimated energy production of 6.60 GWh/year) connected to the national grid. The other 3 operate/operated on isolated grids, viz:
  - ✓ Semonkong (180 kW hydro and 120 kVA diesel), with an estimated energy production of 1.30 GWh/year;
  - ✓ Tlokoeng (460 kW and 210 kW hydro, and 200 kVA diesel) with 33 kV distribution to Mokhotlong and an estimated energy production of 3.30 GWh/year; and
  - ✓ Tsoelike (275 kW and 125 kW hydro, and 200 kVA and 320 kVA diesel) with 33 kV distribution to Qacha's Nek and an estimated energy production of 2.13 GWh/year.

  However, the Tlokoeng and Tsoelike hydroelectric plants have been mothballed since 2001/2002 as a result of the high costs of maintenance and repairs, and other operational problems frequently encountered.

LEC is responsible for electrification within its defined service territory, i.e. within a 3.5 km distance of the existing distribution networks. It presently serves 188,635 customers in the urban and peri urban areas of Maseru and several other districts. The Semonkong (a small town approximately 120 km southeast of Maseru) hybrid hydro/diesel power station operated by LEC, as indicated above, serves some 200 customers, mainly consisting of commercial enterprises/supermarkets and wool shearing activities. The challenge that LEC faces relates to the river supplying the hydro power station running dry in winter, when the load has to be met by the diesel generators. Total losses in the LEC grid were 12.1% in 2013 (Source: LEWA Annual Report, 2013/14) – no breakdown is provided for technical and non-technical (commercial) losses.

Electricity tariffs are established by LEWA (see below) and the same tariffs apply nationwide, irrespective of whether consumers are serviced by the main grid or an isolated grid. The present tariff structure (2014) is provided in Table 1.

Table 1: LEC Tariff Structure (for non-commercial/industrial consumers)

Consumer Category	Tariff (US Cents/kWh)
General Purpose (e.g. shops, schools, SMEs, etc.)	11.84
Domestic (Household)	10.55
Street Lighting	6.24
Electrification Levy for General Purpose and Domestic Consumers, and Street Lighting	0.32

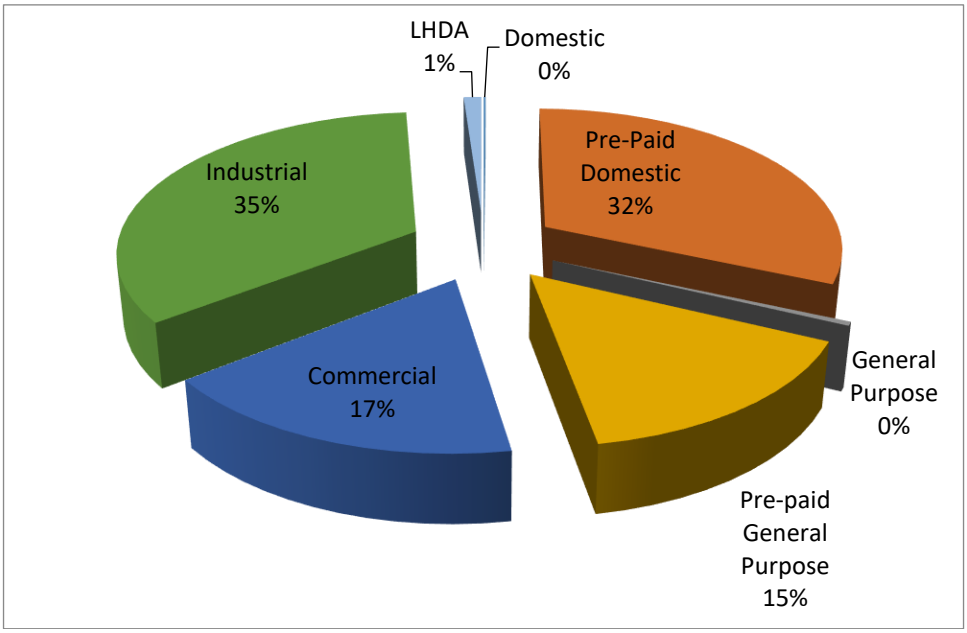
- **Rural Electrification Unit (REU):** REU implements rural electrification efforts through grid extension and cross-border rural electrification with bulk supply from ESKOM, e.g. in Qacha's Nek (Ha Sekake Village), Quthing (Dilli-Dilli and Sinxondo Villages) and Mokhotlong. In the case of Semonkong referred to above, LEC and REU are contemplating the possibility of scrapping the diesel generator and connecting the town to the main LEC grid. REU also has the responsibility for implementing off-grid rural electrification through solar some systems, like in the case of the UNDP-GEF project entitled "Lesotho Renewable Energy Based Rural Electrification" (LREBRE). All REU activities are funded by the Government.

  Fig. 5 shows the electricity consumption by sector in 2014. All electricity consumed by households and by the General Purpose (e.g. shops, schools, SMEs, etc.) sub-sectors is through pre-paid metering, thus eliminating commercial losses (non-payment of electricity bills) by these consumers.

- **Lesotho Electricity and Water Authority (LEWA):** The Lesotho Electricity Authority (LEA), the predecessor of LEWA, was established in 2002 with the objective of regulating the electricity sub-sector in the country. It derives its mandate from the Lesotho Electricity Authority (LEA) Act. No. 12 of 2002, as amended. LEA was re-named LEWA (Lesotho Electricity and Water Authority) in 2013, with its mandate widened to include the water sub-sector in the urban areas. In the electricity sub-sector, LEWA's mandate includes issuing of licenses for electricity activities, approving electricity tariffs, handling disputes between suppliers and customers and monitoring the implementation of Quality of Service and Supply Standards (QoSSS). LEWA is also responsible for administering the Universal Access Fund (UAF- approximately $ 2 -3 million/year) obtained from levies charged to LEC. These funds are available to MEM for "the purpose of subsidising the capital cost with the goal of facilitating the development and expansion of electricity service infrastructure in areas which have been identified by the Government".

- **Bureau of Statistics (BoS):** The Bureau of Statistics is a government department under the Ministry of Development Planning and is mandated "to set up a system for national official statistics on economic, social, demographic, including human resources, and environmental areas in relation to the development needs of

Lesotho; and official statistics for purposes of economic and social planning, research, public information and international cooperation". In addition to undertaking a population census every 10 years (the last one was in 2006), it undertakes a number of surveys that include environmental issues related to energy consumption in households. For example, the Continuous Multipurpose Surveys (CMS) which are undertaken quarterly include questions on payment of electricity bills and expenditures for LPG. BoS also undertakes Energy Consumption Surveys (ECS) that primarily deal with consumption of all forms of energy available in Lesotho. To date, only three sectors have been covered for the years 2012 and 2013, viz. Industry, Government and Health institutions; however, in future, the intention is to cover every sector of the economy. The ECS are implemented by the Environment & Energy Statistics Division (EED) of BoS, in collaboration with the Energy Planning Unit of the Department of Energy. BoS is also benefitting from the support of IAEA (see below), with funding channelled through DoE and under a two-year project entitled "Enhancing the Energy Databank and Building Human Capacity to Support the Energy Policy Framework"; activities under this project commenced in 2014.



Source: LEWA

Fig. 5: Electricity consumption by sector, 2014

- **Department of Standards and Quality Assurance (DSQA)**: Lesotho does not have a national standards body. DSQA is located in the Ministry of Trade and Industry and functions as the focal point for standards and quality assurance. No national standards have been developed to date and industries in Lesotho have traditionally relied on the South African Bureau of Standards and ISO for voluntary standards facilities and quality assurance schemes. Likewise, local exporters have developed their standards according to technical and quality requirements of importing countries or international standards. This is in line with its participation in the SADC (Southern African Development Community) regional programme on Standardisation, Quality, Accreditation and Metrology, a programme that aims to harmonise standards for adoption by all member states.

  One of the lessons learned under the LREBRE project is that many SHS failed during the initial months after installation due to the poor quality of the imported equipment/ancillary components and shoddy installation. Hence, in future interventions with renewable energy technologies, care has to be exercised that only quality equipment and components are allowed for importation into the country and that standards be established for their installation.

1.2 NATIONAL STRATEGIES AND PLANS

Lesotho Vision 2020

The Lesotho Vision 2020 was formulated in 2000 and places the protection of the environment and climate change at the centre of development. It outlines the challenges for "managing and sustaining a healthy environment for sustainable development" and, as Strategic Actions, proposes, among others, to "promote the use of renewable energy resources", "decentralise service delivery and empower communities" and "strengthen and promote private sector participation in managing development".

Lesotho Vision 2020 established the following targets regarding access to electricity services: 35% of the population to have access to electricity by 2015 and 40% by 2020. With the household electrification rate being at 30%, as indicated above, it is very likely that the 2015 target will be met. However, it does remain a fact that only 8.65% (Source: DoE, December 2014) of rural households, compared to 36% in the urban/peri-urban areas, had access to electricity services in 2013.

National Strategic Development Plan 2012/13 – 2016//17

As an implementation strategy for the Lesotho Vision 2020, the Government formulated the National Strategic Development Plan (NSDP) 2012/13 – 2016/17 built upon an earlier Poverty Reduction Strategy Paper that defined national priorities and strategies to reduce poverty and promote equitable economic growth. The NSDP formulation process was officially launched in February 2011 and, in its proposal for implementing actions regarding energy services for the rural areas, indicates that the country will need to invest in "other renewable energy sources, including water and wind, (which) have potential to be particularly important in supplying rural areas that are not connected to the electricity grid". Under Strategic Goal No. 5 "Reverse Environmental Degradation and Adapt to Climate Change", NSDP proposes to "increase clean energy production capacity and environment friendly methods and explore opportunities for carbon trading" and to "develop small-scale electricity generation models that are viable for communities, where connection to the national power grid is not cost-effective".

Lesotho Energy Policy (2015)

The Lesotho Energy Policy 2015, which was recently approved by the Cabinet, is formulated with the vision that "Energy shall be universally accessible and affordable in a sustainable manner, with minimal negative impact on the environment". The four goals of the policy are:

1. Contributing towards the improvement of livelihoods: The energy sector will contribute towards poverty alleviation in Lesotho. This will be achieved through the creation of income generating opportunities that sustain and improve the lives of people in the country through facilitating the provision of affordable technologies and services.
2. Contributing towards economic growth and investment: The energy sector in Lesotho will contribute towards economic growth through initiatives that emphasize efficiency in energy sector management, job creation as well as those that position Lesotho as a competitive player in the SADC region. Emphasis should be placed on the creation of conditions that encourage private investment, but which ensure, where appropriate, that ownership of energy sector resources continues to rest locally.
3. Ensuring security of supply: The Government of Lesotho will ensure security of energy supplies to meet the national requirements from diversified sources that are subject to local resources, regional agreements and economic feasibility.
4. Contributing towards the protection of the environment: Energy resources will be used in such a way that international, regional and local environmental agreements and protocols are observed.

The energy policy will be implemented within the framework of the following principles:

- Integrating energy into national and sectoral planning is a crucial catalyst for energy effective utilisation to improve the livelihoods of the people of Lesotho as well as driving the economic growth;
- Effective coordination of the energy sector is expected to bring a wide spectrum of stakeholders, including vulnerable groups, to share experiences and plan together for better integration of energy into relevant programmes;
- Empowerment of broader stakeholders on energy issues to bring them on board for informed participation will be executed through awareness raising, education and training;
- Public Private Partnerships are viewed as playing a central role in energy project development; especially, they are an important platform for engagement of the private sector in building the economy of Lesotho;
- Stakeholder involvement will be a prerequisite step towards developing a national energy policy; and
- Environmental Sustainability framework will guide the programmes and activities of the energy sector. Continuous capacity building targeted to improve the qualifications and skills in the energy sector.

Lesotho Renewable Energy Policy (Draft - 2013)

The Lesotho Renewable Energy Policy was formulated in 2013 under the Africa Adaptation Programme implemented by UNDP. It aims at creating "a progressive, long-term policy framework to use locally available renewable energy sources" in the country. It proposes to achieve this through the following three main objectives, viz:

1. Enhance energy security of Lesotho by reducing reliance on fossil fuels and imported electricity;
2. Enhance access to modern energy for rural and decentralised areas of Lesotho;
3. Ensure protection of the environment through reduction of greenhouse gas (GHG) emissions from the energy sector in Lesotho as well as to avoid other related environmental damages.

National Electrification Master Plan, 2007: The Government formulated the National Electrification Master Plan with the objective of contributing to the realisation of the national development objectives and the targets outlined in the main reference documents in the Country, such as Vision 2020 and the United Nations Millennium Development Goals. The plan presented medium and long term measures that would play a pivotal role in the acceleration of enhanced electrification access in the country. It proposed 2 different phases for implementation, with Phase 1 running from 2008 through 2013 and Phase 2 to be implemented during 2014 – 2019. The Master Plan has not yet been approved by the Government, although it did implement certain targets such as those related to electrification which were, anyway, articulated in Vision 2020.

National Adaptation Programme of Action (NAPA): Lesotho prepared a National Adaptation Programme of Action against Climate Change (NAPA) in 2007, not only to meet its obligations under UNFCCC, but also to set priorities for action and to integrate climate change concerns into national and sectoral development plans and programmes. The sectors that were assessed during the NAPA process included water, rangelands, forestry, agriculture, soils, health and energy. However, only a limited selection of priority adaptation options was possible, based on recommendations resulting from communities' consultations. The health and energy sectors are not specifically addressed, on account of financial constraints; yet, these sectors of the economy in Lesotho are threatened by climate change risks to such a degree that, if not addressed, they are likely to nullify any efforts for adaptation in the prioritized sectors. A proposal, focusing on developing the necessary information base for climate change action in energy and health sectors was, therefore, prepared under the Africa Adaptation Programme.

Africa Adaptation Programme (AAP): AAP was a strategic initiative funded by the government of Japan and was designed to support the long-term efforts of targeted countries to further develop their capability to successfully identify, design and implement holistic adaptation and disaster risk reduction programmes that are aligned with national development priorities. In Lesotho, AAP worked closely with 5 pilot districts to fund practical adaptation projects. In

addition, as indicated above, AAP funded the formulation of the Lesotho Renewable Energy Policy in 2013, to complement the NAPA. Finally, it installed 3 data-logging stations in 2012 in Lebelonyane, Mokhotlong and Thaba-Tseka to monitor global solar radiation and wind speeds at the standard meteorological height of 10 metres.

Existing laws in the country do allow Independent Power Producers (IPPs) to generate and either sell electricity to LEC under a Power Purchase Agreement (PPA) or operate an isolated mini-grid. However, as the National Electrification Master Plan has not yet been approved, the accompanying guidelines and procedures for private sector participation in the electricity sub-sector, including the feed-in tariff (FIT) are still absent. This has resulted in that no IPP has to date participated in the uptake of the private sector-driven electricity market; the willingness of the private sector to invest in the provision of energy services, as evidenced during meeting with the Lesotho Solar Energy Society, is dampened by the absence of a conducive environment for investment. However, AfDB is currently assisting the Government in implementing a study to establish FITs for IPPs.

First National Communication to UNFCCC: With regard to GHG emissions in the country, the First National Communication to UNFCCC prepared in April 2010, on the basis of inventory studies, indicated that in 1994 (the base year used), Lesotho's GHG emissions amounted to an estimated 5 million tonnes of CO_2, while sinks absorbed 3 million tonnes of CO_2, thus resulting in net GHG emissions of 2 million tonnes of CO_2. A breakdown by sector showed that land use change and forestry was the largest source, being responsible for 38.8% of net emissions, followed by agriculture (33%) and energy (26.3%). As mitigation measures in the energy sector, it proposed (a) promotion of renewable sources of energy for the residential and commercial sectors, (b) promotion of energy efficient devices and (c) the encouragement of energy switching to cleaner sources such as electricity.

Second National Communication to UNFCCC: The Second National Communication submitted in November 2013 estimated that the total GHG emissions in 2000 (the base year used) were 3.5 million tonnes of CO_2 (the National Communication underlined the huge challenge in developing the 2000 GHG inventory because of data being available only at the aggregated national level, rather than at point-source level). It noted that, compared to 1994 emissions, the 2000 net emissions had decreased, with most of the net reductions having occurred in the Land-Use Change and Forestry (LUCF) sector. It further noted that agriculture accounted for 63% of the total emissions, followed by energy with 31% and waste with 6%. However, in terms of net values, emissions in 2000 in the energy sector had increased to 1.1 million tonnes of CO_2, an approximately 30% increase compared to 1994. Projections made in the Second National Communication point to GHG emissions in the energy sector increasing to 2.2 million tonnes of CO_2 by 2015 and to 5.2 million tonnes of CO_2 by 2030 if no remedial action were taken. As the electricity consumption, it is expected to reach 82,000 GWh by 2030 – almost a tenfold increase from the base year of 2000.
Hence, increased use of renewable energy resources is one of the options in a basket of measures that the Government wants to pursue to reverse the increasing trend in GHG emissions related to the electricity sector.

1.3 BASELINE SITUATION AND PROBLEM TO BE ADDRESSED

The Government is cognisant of the fact that 76.3% of the country's population live in the rural areas and only 8.65% (DoE, 2014) of them have access to electricity services. To provide the un-electrified 91.35% of the rural population with electricity services through grid extension will simply be an insurmountable task in view of the very high costs associated with construction of electricity lines across a mountainous terrain to supply the small amounts of electricity that the rural population require. In addition, simply trying to do this would add to more electricity being imported from South Africa/Mozambique, unless massive investments are made in developing the country's abundance of hydropower resources, but, again, the cost of constructing transmission/distribution lines will be prohibitive. Consequently, there is a keen awareness among decision makers, as described above, of the need to shift towards more decentralised, sustainable and modern forms of energy for the much dispersed rural areas in terms of cooking, lighting and heating during the winter months.

Thus, renewable energy sources present an excellent alternative to grid extension. Renewable energy technologies can be utilised in isolated mini-grid configurations to provide the rural population with modern energy services, including electricity.

The Government did explore the option of providing the rural areas with solar home systems through the sale of equipment to interested homeowners. This was undertaken when the Government, with the support of UNDP, implemented the "Lesotho Renewable Energy-Based Rural Electrification Project" (LREBRE) co-financed, among others, by the Government itself and the Global Environment Facility (GEF) from mid-2007 to early 2013. The objective of this project (the total project cost was $ 7.3 million, of which $ 2.7 million was financed by GEF) was to reduce GHG emissions in the country through the improvement of "people's livelihoods by promoting the utilisation of renewable energy to provide basic electricity services to the rural areas not connected to the grid in the Mokhotlong, Thaba-Tseka and Qacha's Nek districts, thus reducing the country's dependency on fossil fuels".

A terminal evaluation was undertaken in mid-2013 upon completion of project activities. The project was to achieve its objective by having, among others, 5,735 solar home systems (SHS) installed at consumer premises in the above districts through cash sales or credit schemes, ultimately leading to the post-project sale of 1,000 SHS/year in the target areas. However, by the end of the project, only 1,537 SHS had been installed and the terminal evaluation report indicates that "it is clear that a significant proportion of these systems are no longer operating", with consumers reporting during field visits that "some systems have never functioned correctly or failed soon after installation, with the main causes being failed inverters and degradation of batteries". The conclusion reached by the terminal evaluation team was that "at least 50% of systems installed by the project have either failed or are providing inadequate service". The terminal evaluation team also (surmised) that the changes to the original SHS system design, poor component quality and recent reconfiguration activities have contributed to a faster than anticipated decline in battery life and that many more systems will fail sooner than normally anticipated". Unfortunately, the successful experience with solar home systems/solar kits as a means of rural electrification/pre-electrification in Kenya, Tanzania, Uganda and elsewhere in the region could not be replicated in Lesotho.

A central feature and key component of the LREBRE project design was to introduce two interrelated financial mechanisms that were designed to address the underlying financial barriers that hamper the adoption of RETs through a market-based approach. A credit guarantee scheme (CGS) was operated via the Central Bank of Lesotho and was meant to mitigate the high up-front capital costs of RE systems and associated lending risks through a government–backed loan guarantee scheme provided to local banks and qualified RET installers/suppliers. In addition, a performance grant scheme (PGS), which was to be funded by the World Bank ($ 500,000 – this funding did not materialise), was designed to provide post-installation grants to dealers/installers for actually installing and maintaining systems. According to the original project design, the maximum government subsidy to be provided for a PV system for household use was 40% of the total capital cost of the system. Credit would be provided to end users by installers via the CGS. However, the Government decided in 2008 to increase the subsidy level to 80% and this led to consumers opting for the heavily subsidised Government scheme, resulting in the market-based approach for SHS experiencing great difficulties to take off.

Proper installation of SHS and quality control of their components need to be strictly enforced to protect consumers from purchasing low quality services/products and adequate after-sales service needs to be promptly available; otherwise, consumers' confidence in these systems gets eroded. Anyway, on the basis of the findings of the terminal evaluation, the Government decided that it would in future pursue a private sector-driven model of isolated renewable energy-based mini-grids for the provision of electricity services to the rural areas, where the grid operators will be responsible for proper operation and maintenance of installed equipment. It was pointed out during the PPG inception workshop that "SHS are not the solution for Lesotho; the objective should be to sell a service, not a technology. This will put the rural population at par (albeit with "skinny grids") with those residing in the urban areas in that they need not purchase their electricity generating systems; instead, they get connected to an isolated mini-grid and pay for the services they receive on a regular basis". These mini or "skinny" grids can provide energy access at a fraction of the cost of grid extension and "can unlock affordable initial interventions -- like lighting, mobile phone charging, fans, and TVs plus a small

amount of agro processing -- to help people get onto the energy ladder today rather than forcing them to wait decades for a grid extension that may never come" (ref. Sierra Club, 2014). Of course, in those site-specific locations where the possibility exists to utilise micro/mini hydropower and/or wind energy, these renewable energy technologies will be the preferred option in view of their lower cost of electricity generation compared to PV. With regard to duties and taxes, the Government is considering their removal on all renewable energy technologies.

Box 1 below presents information gathered during implementation of the PPG in the village of Ha Khoai Matete and illustrates the difficulties that the rural population have to go through to meet their basic energy needs. This village is located some 175 km by paved, followed by dirt road, to the south of Maseru. It demonstrates the void that Energy Centres can fill to provide the rural population with modernised energy services.

Energy Centre Option: Case of Ha Khoai Matete

Ha Khoai Matete is a village located some 175 km by tar road, followed by dirt road to the south of Maseru. It consists of 110 households with an average family size of 6 persons; some of the households consist of up to 11 persons. These households mainly use twigs collected from the nearby mountain for cooking, and kerosene for cooking/lighting. Those households that are better off, instead, use LPG for cooking.

On average, 1 candle (cost: 75 US Cents) is used every 3 days for lighting. For lighting with kerosene, a household uses 1 litre (cost: $ 1.30/litre) every 4 days and those using kerosene for partial cooking, 0.75 litre on average is utilised on a daily basis.

The closest town is Mohale's Hoek, some 50 km away. Hence, to purchase their supply of LPG, kerosene or candles, the villages have to disburse almost $ 16 round-trip for transportation (for both passenger and cylinder), taking almost 3 hrs each way along a tar/dirt road. For comparison purposes, a 19 kg re-filled LPG cylinder that can last just over a month for cooking costs $ 27. Hence, just to purchase a re-filled LPG cylinder, a household needs to spend an additional 60% on transportation.

Alternative Option: An Energy Centre in or close to the village would greatly facilitate the households' access to LPG, kerosene, candles, etc. and save them some cost of transportation (and time) in the process. In addition, the villagers would be exposed to improved cook stoves that are, otherwise, available in the big cities and retail for approximately $ 100; they use only small wood sticks as fuel, are smokeless and can be used for a range of cooking activities, including frying. For example, only a handful of sticks is required to cook 2 kg of beans, peas or lentils. In addition, some of the improved cook stoves come with a "wonder box", i.e. an insulated "thermos" that allows cooking to continue with the residual heat, while also keeping the food hot for a few hours. One model of cook stoves incorporates a small fan to facilitate combustion and this stove design comes with a 5 W solar panel to power the fan. As an added incentive for using such a stove, it includes a mobile phone charging "outlet", again powered by the same solar panel.

The useful life of improved cook stoves is 5 years. They are made of a stainless steel outer shell and a ceramic inner chamber.

Box 1: The Need for Energy Centres

1.4 BARRIERS TO RENEWABLE ENERGY-OPERATED ISOLATED MINI-GRIDS IN LESOTHO

As indicated earlier, there is hardly any experience in the country with small-scale renewable energy systems and no experience with renewable energy-operated isolated mini-grids. Besides solar home systems (SHS) installed under donor-financed projects mentioned earlier, the other experience with PV in the country relates to water pumping, telecommunications and individual street lighting units. Moreover, there is little or no experience with micro-hydro or wind systems.

The present project will provide a start to utilising renewable energy-based mini-grids to provide modern energy services to the rural areas, given the very promising potential that renewable energy technologies (mainly solar, but also biomass, micro-hydro and wind at site-specific locations, where available) have to reduce GHG emissions and improve livelihoods of the population, especially of those 76 % living in the rural areas. A novel approach will be applied through enabling the private sector to drive the initiative to develop these mini-grids in the country; the crucial role of the Government will be to create the appropriate environment for this private sector-driven modality to successfully move forward.

In line with the foregoing, GEF intervention is needed to remove the policy, regulatory and market barriers which hamper realization of the Government plans to harness the relatively abundant renewable/solar energy potential in the country. Some of the main barriers are:

- Policy: The Ministry of Energy and Meteorology (MEM), as the Government Agency directly responsible for renewable energy development, is the central body responsible for formulating and implementing the Government's policy in renewable energy and energy efficiency. The Government has recently approved the 2015 Lesotho Energy Policy, but the Lesotho Renewable Energy Policy that was formulated in 2013 is still in draft form. In the absence of a clear policy and regulatory framework to promote private sector participation in energy service delivery for (both grid- and) off-grid services, the private sector, although interested in venturing into this business, has been reluctant to invest in the provision of modern energy services for the rural areas. By putting such a policy in place, the Government will open the way for investment in off-grid rural electrification that can also draw on the current cross-subsidy mechanism already established for grid services.
  Hence, the project will assist the Government in addressing this specific policy barrier that will lead the way for private sector investment in mini-grid applications and village energisation schemes.

- Institutional: A major issue in the energy sector is the availability of data. The last comprehensive energy survey in the country was carried out in 1985 during the development of the Lesotho Energy Master Plan (LEMP). The LEMP exercise subsequently developed an energy model called the Lesotho Energy Information System (LEIS) which was used as the national energy planning model with projections of supply and demand for energy up to the year 2010. Since then, there have been no new energy surveys undertaken, although the Bureau of Statistics conducted two limited-scope surveys in 2014, viz: (i) Survey of energy use in government offices; and (ii) Survey of energy use in government-run health institutions, with support from the IAEA. Consequently, the absence of up-to-date (baseline) energy data seriously impacts on the ability of the Government to make informed decisions regarding the energy sector. In addition, Lesotho has no comprehensive targets in relation to its SE4All goals; the only stipulated targets are those provided by the NSDP in relation to electrification rates.

  In response to the institutional barriers outlined above, the project will specifically (i) design and implement a national survey on energy supply, consumption and demand, disaggregated by sector, district and application; (ii) establish an energy database and information system; and (iii) put in place an energy modelling software to analyse data, model scenarios and produce information that will promote renewable energy initiatives.

- Regulatory: Even though the "barriers to private sector investment in modern energy for productive and socio-economic uses with a focus on energy efficiency and renewable energy technologies and solutions" were articulated in the 2012 "Rapid Assessment and Gap Analysis" in connection with the SE4All Initiative, an appropriate legal and regulatory framework on the use of renewable energy resources in rural mini-grids is lacking. These relate to, for example, any licensing that may be required before a mini-grid can be built, any Environmental Impact Assessment that will be required before an investor is given a license to build a mini-grid, quality of the electricity service to be provided to rural customers, etc.

- Financial: Discussions held during implementation of the PPG indicated that private sector investors consider the availability of credit as a major bottleneck to venturing into business opportunities in rural mini-grids. The

high upfront capital costs for renewable energy and limited project finance from local banks were also highlighted in the "Rapid Assessment and Gap Analysis". Hence, in order to facilitate the uptake of renewable energy-based rural mini-grids, thus minimising the financial risks to investors and lenders alike, the project will establish a Financial Support Scheme (FSS) that will consist of $ 1.2 million ($ 1.0 million from GEF and $ 0.2 million from UNDP) that will be available to private sector investors through the DoE to: (i) Serve as a performance-based incentive (PBI) fund (a subsidy that is also referred to as OBA – output based aid) that will be paid directly to them, based on actual energy production of the renewable energy system; (b) Support the preparation of feasibility studies/business plans (FS/BP) and partial investment for isolated renewable energy-based mini-grids; and (c) Support the establishment of 10 Energy Centres, with each serving some 5 surrounding villages.

- Technical: One of the lessons learned under the LREBRE project is that many SHS failed during the initial months after installation due to the poor quality of the imported equipment/ancillary components and shoddy installation practices. Hence, in future interventions with renewable energy technologies, care has to be exercised that only quality equipment and components are allowed for importation into the country and that standards be established for their installation. Therefore, there is a need to establish in Lesotho a mechanism for ensuring that renewable energy technologies comply with internationally recognised technical standards and that these standards are enforced for all procurement and installation. This will be achieved through working with the Department of Standards and Quality Assurance (DSQA) of the Ministry of Trade and Industry and will be aimed at providing investors and consumers alike with assurance and confidence in the quality of equipment they purchase or services they receive.

- Economical/Social: Poverty, tradition and lack of alternatives drive communities and individuals to continue to carry out unsustainable practices of resource exploitation (e.g. shrub cutting that leads to soil erosion, burning of dung which could otherwise have been utilised as fertiliser). The lack of jobs and alternative options for income generation drive the rural exodus. During village interviews at the PPG stage, all communities expressed the need for social and economic benefits in their villages (health and income-generating activities) as well as improved natural resource management.
  The project will address these issues through the provision of modern energy services to promote better quality of life and provide opportunities for income-generating activities in the rural areas.

- Promotion/Outreach: In the absence of any experience with private sector-implemented renewable energy-based mini-grids, there is evidently a low awareness among a wide range of stakeholders on the benefits that RETs can provide to improve livelihoods in the rural areas. Of course, this results in a total lack of information on in-country best practices and lessons learned. Once implementation has started, this situation will be remedied through the compilation and publication of project experience and best practices in electronic/printed form.

A summary of the barriers and the strategy for addressing them are presented in Table 2 below.

Table 2: Summary of barriers and mitigation strategies

Barrier	Present Situation	Strategy for addressing barrier
Policy	Absence of policy and regulatory framework to promote private sector participation in off-grid services.	Outcome 1: Support to put in place a conducive policy.

Institutional	Paucity of energy data to make informed policy decisions.	Outcome 2: Design and implement a national energy survey, establish energy database and procure/operationalise energy modelling software to analyse data, model scenarios.
Regulatory	Absence of appropriate legal and regulatory framework for implementing rural mini-grids.	Outcome 1: Develop and put in place an appropriate legal and regulatory framework for rural mini-grids.
Financial	Absence of a financial mechanism to facilitate uptake of uptake of renewable energy-based rural mini-grids.	Outcome 3: Establish and operationalise a Financial Support Scheme.
Technical	Lack of standards for imported equipment and insufficient skills for proper installation.	Outcome 3: Capacity development of stakeholders.
Economical/Social	Absence of options for alternative income-generating activities in the communities.	Outcome 3: Provide options to implement income generating activities through utilisation of modern energy services.
Promotion/ Outreach	Lack of promotional/outreach activities and absence of project experience/best practices.	Outcome 4: Implement outreach/promotional activities and document project experience.

1.5 RENEWABLE ENERGY-BASED ISOLATED MINI-GRIDS: LESSONS LEARNED IN OTHER COUNTRIES

Experience to date in Lesotho with isolated grids relates only to those operating on micro/mini hydropower stations referred to earlier, except for the hybrid hydro-diesel-based isolated grid at Semonkong. An isolated diesel-based mini-grid operated for a few years in Sekake, some 45 km from Qacha's Nek, but the supply of diesel fuel combined with very expensive maintenance and repair resulted in the Government putting an end to diesel electricity generation there and connecting the town to the ESKOM grid at Ha Mpiti.

During 2007 – 2009, the Government installed 5x50 kVA diesel generator sets in Ketane, approximately 300 km southeast of Maseru and constructed a distribution system. However, this power station never went into operation due to the difficult terrain for diesel fuel transportation, the very high cost in fuel delivery (about $ 140/barrel) and the absence of locally available capacity to operate and maintain it.

Lesotho does not have any experience with renewable energy-operated isolated mini-grids. To date, SHS were installed under the LREBRE project mentioned earlier and the $ 200,000 AfDB-financed project which saw the installation of 200 fee-for-service 100-W SHS at Mphaki during 2009 – 2013. The other experience with renewable energy in the country relates to PV water pumping, telecommunications, individual street lighting units consisting of a mast, PV panel, battery and LEDs, etc.; many of these installations were financed by the Energy and Environment Partnership Programme (EEP) for Southern and Eastern Africa (EEP is jointly funded by the Ministry for Foreign Affairs of Finland (lead donor), the Austrian Development Agency (ADA) and the UK Department for International Development (DFID), while the EEP Coordination Office is hosted by KPMG in Finland) and installation of PV/solar water heaters at rural clinics under the Millennium Challenge Account. The largest PV installation in the country is the 280 kW grid-connected plant that was built with support from the Government of Japan at the Moshoeshoe I International airport and which commenced operation in September 2013. In total, some 600 kW of PV are presently installed in the country and a

preliminary estimate is that 75 % of this capacity is still operating. Hence, it makes eminent sense for Lesotho to learn from the experience of other countries that already have experience with private sector-operated, renewable energy-based (including PV) isolated mini-grids prior to embarking on a programme of its own.

In this connection, the United States Agency for International Development (USAID), in collaboration with the Alliance for Rural Electrification (ARE) prepared in 2012 a comprehensive study entitled "Hybrid Mini-grids for Rural Electrification: Lessons Learned". Although the study deals with hybrid mini-grids, it extensively covers the subject of renewable energy-based mini-grids that utilise localised renewable energy resources to provide "centralized" electricity generation at the local level, using a village-wide distribution network. The study supports the establishment of renewable energy-based mini-grids that "provide capacity for both domestic appliances and local businesses and have the potential to become the most powerful technological approach for accelerated rural electrification". The main lessons learned described below (Source: USAID/ARE Publication - www.ruralelec.org) relate only to the private sector-based model that the project wishes to pursue, although the study itself discusses other business models, such as the "Community-based Model", the "Utility-based Model" and the "Hybrid Model", with the last model combining approaches from the others, but being the hardest to define in practice.

A private-sector model can take different forms according to the ownership of the system and the mini-grid, the type of contracts with end-users and the type of subsidies. However, the principal advantage is that it usually provides electricity more efficiently than any other model. The main lessons learned are:

- Deployment of mini-grids involves complex financial and organizational questions. The bottlenecks for the sustainable success of mini-grids are not the technologies, but financing, management, business models, maintenance, sustainable operations, and socio-economic conditions. Each community presents a cluster of characteristics and interests which will define the best technical solution according to local financial, social, and environmental terms.

- The operator should be the main designer of its system and its technology. The main project driver should be costs and quality, including consumer health and the environment.

- Output–based aid subsidies and long-term concession, when well designed, are attractive schemes to increase private sector participation.

- A certain level of standardization of the administrative procedures and bidding process is advised to reach a fair degree of replication and economies of scale.

- Strong and targeted marketing around the call for tenders and the programme are critical to increase private sector participation.

- Education and awareness campaigns are justified to support their development on the basis that they are cheaper and more sustainable options.

- Financially viable tariffs need to be designed to allow for sufficient return on investment to attract private sector investors. Private sector participation may result in higher tariffs, or in higher subsidies to keep tariffs affordable, but also in more efficient operation.
- An important task to ensure the sustainable operation of a mini-grid is payment collection. First of all, the payment method has to be clearly defined, stated, and well publicized up-front for all the end-users to be aware of the expectations. Clear records must be maintained by the person(s) responsible and be available for review. The importance of paying the fees must also be clearly explained, with the possible consequences for individuals (and the whole community) for anyone who tampers with the meter or fails to pay up.

2. STRATEGY

PROJECT RATIONALE AND POLICY CONFORMITY

The project's goal is to reduce GHG emissions by creating a favourable legal, regulatory and market environment and building institutional, administrative and technical capacities to promote rural electrification through isolated renewable energy-based mini-grids.

In the business-as-usual scenario, implementation of rural electrification for the majority of the population with reliance solely on budgetary resources and without the participation of the private sector, will take a very long time to materialise. Hence, the project will support the Government of Lesotho, working with the private sector, to use the approach of renewable energy-based technologies to generate electricity that will enable the rural population to embark upon income-generating activities utilising electricity services. This is proposed to be achieved through the following:

- Streamlining and simplifying policy, regulatory, legislative and financial instruments for renewable energy-based isolated mini-grids for rural electrification;
- Developing capacity of stakeholders for renewable energy-based isolated mini-grids for rural electrification;
- Creating attractive and competitive business terms and conditions for investors, such as providing financial incentives towards project development and implementation, which will give developers long-term stability and provide for sufficient investment return; and
- Facilitating implementation of renewable energy-based isolated mini-grids for rural electrification in the country through a pool of trained technicians who would ensure high quality construction, operation and maintenance of the systems and ancillary equipment.

ALIGNMENT WITH GEF PROGRAMMING STRATEGY

The project is consistent with GEF-5, Climate Change Objective 3: "Promote Investment in Renewable Energy Technologies" aimed at reducing GHG emissions. It will promote the market for the utilisation of renewable energy sources to meet the needs of off-grid rural communities for energy services. In line with GEF requirements, "the emphasis will be upon developing policies and regulatory frameworks that provide limited incremental support to strategically important investments", such as investment in utilising renewable energy sources (biomass, hydro, solar, wind) that will allow the country to cope with meeting the demand for rural energy services in an environmentally and climate-friendly way. Further, the "host country willingness to adopt favourable policies and to follow through on the initiatives" was demonstrated by the Government during the formulation and approval of the 2015 Energy Policy.

VILLAGE ENERGY CENTRES

In addition to village mini-grids, the project will support the setting up of 10 Energy Centres in "non-grid" villages, with each strategically situated to serve at least 5 surrounding villages, similar to the Multipurpose Clean Energy Centre (Box 2) that the Government is setting up in Lekokoaneng with the support of UNECA. These Energy Centres will present an interim solution to those non-energised villages while they await the setting up of renewable energy-based mini-grids in, hopefully, not a too distant future.

In those villages where mini-grids will be established, the private sector developer will be encouraged to utilise part of its workshop facilities as an Energy Centre to meet the needs of their customers in terms of LED lights, small electrical appliances, etc. The Energy Centres will be barred, for example, from selling incandescent bulbs; moreover, the project will work with the Department of Standards to ban their importation, in the long term, into the country, in favour of LEDs.

Lekokoaneng Multipurpose Clean Energy Centre, Berea District

As per the 2006 Lesotho Census Village List by the Bureau of Statistics, Lekokoaneng and its vicinity have 9,567 inhabitants, clustered in about 2,375 households. In addition, since Lekokoaneng lies along the Main North One road between Maseru and Leribe, there are thousands of people passing through it daily. The place also hosts between 3,000 and 4,000 people from across Lesotho and Southern Africa, at least three times a year, who visit the place for religious purposes.

The area also houses 5 schools and 4 main churches. The place also has about 18 small retail businesses as well as 3 operational sandstone mines.

Capital requirements for the Clean Energy Centre: $ 110,000, with approximately 78% of the funds to be utilised for initial stock procurement. The remaining funds will be utilised to finance the construction of the energy-efficient Clean Energy Centre, to procure office equipment/furniture, for staff training and for use as working capital.

Designated Operator: Central Farmers Association.

Status: Operations to commence during second half of 2015.

Box 2: Lekokoaneng Multipurpose Clean Energy Centre

In addition, these Energy Centres will stock SHS, PV-operated portable LED lights, mobile phone chargers, gas cylinders, paraffin (kerosene), improved cook stoves, candles, etc. to provide options to and serve the energy needs of those customers who reside in their catchment area and "non-grid" neighbouring villages. This is motivated by the fact that no major efforts are being made to disseminate modern lighting, cooking and heating devices at or close to the "point of use" in rural areas. These are available at commercial rates in urban and peri-urban areas, but dissemination and uptake in rural and remote areas have been limited due to challenges of accessibility/transportation.

FINANCIAL SUPPORT TO PROJECT DEVELOPERS

Investment in renewable energy projects often requires to be supported with financial incentives, at least initially, because such projects are not only typically more investment-intensive in terms of upfront costs, but they are also, in some cases, considered to be riskier investments due to technology or resource uncertainties. The degree to which cost and risk factors apply varies according to technology and geographical location and project developers expect some form of financial support/risk-sharing to compensate them for taking on additional financial risks due to, as in the case of Lesotho, the absence of a working business model that can be emulated. There needs to be a policy and regulatory framework developed for private sector participation in energy service delivery for off-grid services. Such a mechanism would open the way for sustainable project development financing for rural electrification and a sustainable operating subsidy mechanism for off-grid services that draws on the current cross-subsidy already established for on-grid services.

In Lesotho, the upfront cost of a PV system, complete with Balance of System and inverter, is estimated at approximately $ 5,000/kW installed, at present-day prices, and has an average daily output of 6 kWh/kW installed/day. Coupled with the cost of stringing a distribution grid and in the absence of a financially viable tariff, it makes it difficult for private sector investors to venture into this territory for developing new business opportunities. For example, in the case of Semonkong, the cost of electricity generation at the isolated hybrid hydro/diesel power station is 62 US Cents/kWh, but consumers get charged the same tariffs prevailing in Maseru and other districts (approximately 11 – 12 US Cents/kWh ref. Table 1 above) in order to make the service affordable to them, with subsidies provided by LEWA's Universal Access Fund through the Department of Energy.

The high upfront investment cost of renewable energy is a major barrier, as private investors will need to leverage funding. This is highlighted in the World Economic Forum's Competitiveness Report (4th Quarter, 2014) that indicates that "access to finance is one of the biggest challenges in Lesotho". The second major barrier is the setting of an appropriate tariff, allowing financial viability of the system, but also taking into account the capacity to pay in rural areas. In order to ease the burden on investors, the project considered the options of either a Loan Guarantee Fund (LGF) or a direct Financial Support Scheme (FSS).

Loan Guarantee Fund (LGF): An LGF, in its most common form, is an independent entity that acts as a third party between a lending bank and a borrower/investor who does not meet all of the bank requirements, but is otherwise considered a fairly good credit risk. The LGF provides the bank security, in the form of a guarantee for a portion of the loan, in order to enable the investor to obtain debt financing. If the loan application is approved, the LGF provides the bank a guarantee for the required amount of collateral, and the loan is issued. The investor, in turn, repays the lending bank plus an LGF annual fee, typically between 2-5% of the loan value, which can be included in the loan payments. If the borrower repays the loan, the LGF is released from its guarantee. However, if the borrower defaults on the loan, and the bank met all of its obligations in attempting to collect on the debt, the LGF will reimburse the bank for the agreed amount and, simultaneously, initiate judicial proceedings against the borrower to recover its balance of payment to the bank.

In many countries where LGFs have been used, well-managed LGFs reasonably expect to have a multiplier effect of 5 or more, i.e. $ 1 million in LGF capital can realistically translate into at least $ 5 million in guarantees to banks. However, in discussions with some banks operating in Lesotho (e.g. First National Bank, Nedbank and Standard Lesotho Bank), they were unwilling, because of potential default risks due to unfamiliarity with renewable energy-based mini-grids and the poor performance of SHS installed in the country, to entertain any multiplier effect, meaning that if the project were to set up an LGF of $ 1 million, only $ 1 million in loans could be guaranteed. In view of this serious limitation with regard to the multiplier effect, the project does not propose to pursue the LGF option, although the local banks did confirm their interest in making loans for renewable energy provided that acceptable risk-mitigation measures were in place.

Financial Support Scheme (FSS): Hence, the project considered the other option, i.e. of an FSS that will provide direct support to the investor, through the DoE, to (i) design and install a mini-grid that will perform efficiently, (ii) make it easier for investors to mobilise debt financing and (iii) provide tariff relief to isolated rural consumers, just like those connected to conventional energy-based mini-grids. Accordingly, the project will establish an FSS in the amount of $ 1,200,000 ($ 1,000,000 from GEF and $ 200,000 from UNDP) for the following purposes:

(a) To establish a performance-based incentive (PBI) fund (a subsidy that is also referred to as OBA – output-based aid) that will be paid directly to the project developer, through the DoE, based on actual energy production of the PV or renewable energy system. This will not only enable the developer to keep the tariff low, but will also be effective in motivating developers/system owners to target project sustainability by focussing on proper design, installation, maintenance and performance of their renewable energy systems, since the payment will be based upon the actual energy produced. This subsidy is intended to decline over time as the service provider improves efficiency and as end-user revenues increase. It also provides policy makers and regulators with assurance that incentives provided are being effectively managed and not wasted on a system with poor performance.

For the PBI component of the Financial Support Scheme, the project will allocate a joint GEF-UNDP fund with an initial capital of $ 300,000, viz. $ 250,000 from GEF funds and $ 50,000 from UNDP. Under the assumption that an average of 15 kW of PV (or equivalent in terms of other RETs) will be installed at each of the 10 village mini-grids, the combined daily energy generation will be 900 kWh and over a period of 4 years (assuming that activities during Year 1 of the project will mainly focus in setting up the policy/regulatory framework and that village energisation will commence in Year 2), some 1,314,000 kWh[3] will have been generated. Again, assuming that a subsidy of 20 US Cents/kWh will be

[3] 900 kWh/day/village x 10 villages x 365 days/year x 4 years

provided to the developers to enable them to maintain the household electricity tariff at par with the basic tariff of 11 US Cents that is applicable throughout the country (as a reference, the average feed-in-tariff is 30 - 35 US Cents in Kenya, Tanzania and Uganda for PV mini-grids), the total 4-year disbursement under the PBI component will be $ 262,800. Thus, the PBI allocation of $ 300,000 will be largely sufficient as subsidy until the project ends and even to cover some increase in the output of the renewable energy mini-grids.

(b) To support the preparation of feasibility studies/business plans (FS/BP) and partial investment for isolated renewable energy-based mini-grids. This will be achieved through the provision of a grant, through the DoE, to eligible project developers selected on the basis of competitive bidding, in an amount of up to 50% for each of the costs involved for the feasibility study and the investment grant, with a maximum per project allocation not exceeding $ 60,000. It will serve as an incentive to project developers to venture into the business of utilising renewable energy for mini-grid electricity generation. These funds will be paid directly to the consultants/consultancy group preparing the FS/BP and implementing the works, and disbursements in tranches would be made as per a set of established benchmarks.

For this component of the Financial Support Scheme, the project will allocate a joint GEF-UNDP fund with an initial capital of $ 600,000, viz. $ 500,000 from GEF funds and $ 100,000 from UNDP. This amount is expected to be sufficient to cover support and promotion of the renewable energy-based mini-grid programme for the 10 villages that will each install one mini-grid during the 5-year project lifetime.

(c) To support the establishment of 10 Energy Centres, with each serving some 5 surrounding villages. This component will have an initial capital of $ 300,000, viz. $ 250,000 from GEF funds and $ 50,000 from UNDP. At the end of each year of operation, each Energy Centre will receive a subsidy in the amount of $ 7,500, subject to demonstrating proof that they facilitate access to modernised energy services to the communities they serve. The total subsidy to each Energy Centre by the end of the project should not have exceeded 50% of the initial cost of its establishment. These funds will again be channelled through DoE and the developer for each Centre will be selected on the basis of competitive bidding.

Box 3 below provides a snapshot of how the FSS will be set up and operate:

Financial Support Scheme Snapshot

Purpose:

(a) To establish a performance-based incentive (PBI) fund that will not only enable a developer to keep the tariff low, but will also be effective in motivating developers/system owners to target project sustainability by focussing on proper design, installation, maintenance and performance of their renewable energy-based systems, since the payment will be based upon the actual energy produced.

Initial capital of $ 300,000, viz. $ 250,000 from GEF funds and $ 50,000 from UNDP.

(b) To support the preparation of feasibility studies/business plans (FS/BP) and partial investment for isolated renewable energy-based mini-grids. This will be achieved through the provision of a grant to eligible project developers, through the DoE, in an amount of up to 50% for each of the costs involved for the feasibility study and the investment grant, with a maximum per project allocation not exceeding $ 60,000.
Initial capital of $ 600,000, viz. $ 500,000 from GEF funds and $ 100,000 from UNDP.

(c) To support the establishment of 10 Energy Centres, with each serving some 5 surrounding villages. This component will have an initial capital of $ 300,000, viz. $ 250,000 from GEF funds and $ 50,000 from UNDP. This subsidy will be a maximum of $ 7,500 per EC/year over a 4-year period, payable at the end of each year of operation. However, the total subsidy to each Energy Centre by the end of the project should not have exceeded 50% of the initial cost of its establishment.

Initial Capitalisation: $ 1,200,000 ($ 1,000,000 from GEF and $ 200,000 from UNDP). This will be sufficient to disbursements for all 3 components above during the 5-year project timeframe.

Funds Host/Manager: Lesotho Electricity and Water Authority (LEWA).

Additional Capitalisation Target from other donors/Government of Lesotho: $ 5 million.

Box 3: Financial Support Scheme Snapshot

The purpose of the Financial Support Scheme (FSS) is two-fold: first, it is designed to jump-start the market for isolated PV/renewable energy mini-grids and Energy Centres through a reduced amount of debt financing required, resulting in a buy-down in the total interest amount that would have been chargeable to developers. As the project builds up experience and transaction costs go down, the percentage of grant/subsidy will decrease until a point is reached when sufficient experience would have been accumulated that would provide confidence to enable other developers to embark on new projects based solely on their initial capital and debt financing. When this point is reached, the subsidy would then be eliminated altogether. The second purpose is to initially minimise any potential risk on the part of lenders in making loans for renewable energy-based mini-grids/Energy Centres, by shifting some risk of loss of capital to the investment grant. As they accumulate experience with such loans and repayments, the lenders will have developed sufficient confidence in continuing making additional loans, even in the absence of any subsidy, thus incorporating loans for such systems as a regular retail product into their loan operations.

Prior to allocating this grant, management of the FSS (see below) may request the project developer/private sector to provide evidence that it can bring in some 10 to 15% of equity capital in case its FS/BP qualifies it for consideration for debt financing. Disbursement of this grant will be through the DoE and in accordance with UNDP rules and regulations and, following approval, funds will be promptly released.

It has been clarified above that the purpose of the PBI and investment grant is to jump-start the market to buy down the initial investment required by the promoter/developer and, consequently, reduce the total interest amount payable, and to make the electricity tariff affordable to rural consumers. In discussions with project developers, this issue will be highlighted and the website will also make it clear that the subsidy is specifically earmarked for reducing transaction

costs during the initial years of the Government's programme for renewable energy-based isolated mini-grids for rural electrification. This, it is hoped, will sensitise project developers to the fact that no more subsidies may be available upon completion of the project nor will they likely be necessary to enable them to achieve a reasonable rate of return on their investment.

There is, of course, a fundamental question of sustainability of resources available under the FSS for this financial support to project developers beyond the project's lifetime of 5 years. Neither the project nor the Government wants such an important modality for reducing the country's import of fossil fuel through substitution with locally available renewable energy to meet the energy needs of rural communities not to be sustainable. In fact, the project expects that the experience gained through the operation of the FSS will act as a magnet to other donors (and the Government through the Universal Fund) to further capitalise it beyond the initial $ 1,200,000 ($ 300,000 each for the PBI and Energy Centres and $ 600,000 for the Investment Grant) with a target of a total of $ 5 million, so that the country can continue benefitting from investment in sustainable modern energy services.

Exit Strategy: For all practical purposes, the FSS is not expected to be a short-lived mechanism; instead, it is meant to be in operation until such time that project promoters/developers gain sufficient confidence that the risks of investing in off-grid renewable energy-based electrification and Energy Centres have been minimised and/or eliminated through the project. Hence, upon completion of the project, any remaining funds under the FSS will remain under the management of the Lesotho Electricity and Water Authority until such time that the Government determines that a continuation of activities in this area will no longer require financial support from the FSS.

Operationalising the FSS

The FSS fund will be hosted/managed by LEWA and will have an Advisory Committee consisting of representatives of the Ministry of Energy and Meteorology (MEM) and UNDP. As discussed above, disbursements of the investment grant/subsidy will be made when there is sufficient evidence that it is likely that the developer does qualify for debt financing from a lending institution. For the PBI, funds will be disbursed to the developer, again through the DoE, on a monthly basis, upon certification of the number of kWh generated, for which purpose metering at the developer's premises would be required.

Country ownership: country eligibility and country drivenness

Rural electrification through isolated, renewable energy-based mini-grids, which has not been the focus of much attention to date, is one of the important mitigations options that the Government of Lesotho wishes to pursue for reducing greenhouse gas emissions in the country. In this connection, the Second National Communication to UNFCCC prepared in November 2013 identified the energy sector as the second GHG emitter, after the agricultural sector. In terms of net values, emissions in 2000 in the energy sector had increased to 1.1 million tonnes of CO_2, an approximately 30% increase compared to 1994. Projections made in the Second National Communication point to GHG emissions in the energy sector increasing to 5.2 million tonnes of CO_2 by 2030 if no remedial action were taken.

Also, the Lesotho Energy Policy 2015 underscores the country's necessity to, among others, contribute towards the improvement of livelihoods "through the creation of income generating opportunities that sustain and improve the lives of people in the country through facilitating the provision of affordable technologies and services" and to utilise energy resources "in such a way that international, regional and local environmental agreements and protocols are observed".

Thus, the project is in line with national priorities and will contribute to meeting the objectives of the Government on global warming and energy development.

Design principles and strategic considerations

The project will promote a market-driven approach to encourage the participation of the private sector to generate electricity in the rural areas through renewable energy technologies. In line with GEF requirements, "the emphasis will be upon developing policies and regulatory frameworks that provide limited incremental support to strategically important investments", such as investment in renewable energy electricity generation, allowing the country to move towards energy independence and increased energy security in an environmentally and climate-friendly way.

As the law presently stands, the private sector (IPP) is allowed to generate electricity and either sell it to LEC under a Power Purchase Agreement (PPA) or operate an isolated mini-grid. Still, the accompanying guidelines and procedures for private sector participation in the electricity sub-sector, including the feed-in tariff (FIT) and or/tariffs to be paid by consumers connected to isolated mini-grids have not been formulated. As a result, no IPP has to date participated in the uptake of the private sector-driven electricity market. However, the recently-approved Lesotho Energy Policy 2015 demonstrates "host country willingness to adopt favourable policies and to follow through on the initiatives", underscoring the importance of involving private sector participation in delivering modernised energy services to the large number of "unserved" households in the rural areas. Accordingly, the project will assist the Government to realise the objectives of the Lesotho Energy Policy 2015 to design and adopt regulations and provide investment support aimed at promoting private-sector driven rural electrification through the utilisation of renewable energy technologies.

PROJECT OBJECTIVE, OUTCOMES AND OUTPUTS/ACTIVITIES

The objective of the project is to catalyse investments in renewable energy-based mini-grids and Energy Centres to reduce GHG emissions and contribute to the achievement of Lesotho's Vision 2020 and SE4All goals. It proposes to put in place an enabling environment for the development of these renewable energy systems and develop a suitable business model and financial instruments for their viability and replication. It will also showcase a new business model that combines confidence with sustainability and replication. This objective is proposed to be achieved through the participation of the private sector working hand in hand with village community organisations. Thus, this programme will not only benefit rural households and small commercial enterprises, but will also connect the private sector, financial institutions, technical training and local organisations to promote the establishment of distribution channels to develop the renewable energy market for the provision of electricity services.

As indicated earlier, past off-grid renewable energy-based rural electrification efforts were overly focused on procurement and delivery of systems rather than a service delivery model with private sector partners. In addition, there is currently no major effort to disseminate more efficient thermal energy devices (e.g. cook stoves) on any significant scale in rural and peri-urban areas. For the country to achieve its Vision 2020 objectives and mobilize additional investments under SE4All, it needs to develop a replicable, market-based and vertically-integrated model for village-based clean energy provision and this is proposed to be set in motion with renewable energy-based mini-grids together with the establishment of Energy Centres where consumers will also have access to non-electrical modernised energy sources and appliances like LPG, improved cook stoves, portable LED lights, etc. In addition, the Government has demonstrated strong commitment to SE4All targets and its intention to continue to provide basic energy services to rural communities and promote the use of renewable energy technologies is evidenced in the 2014/2015 national budget where more than 50% of the $ 7.7 million (Maloti 84.9 million) available to the electricity sector is earmarked to implement its Rural Electrification Programme.

This project will pioneer the functioning of an effective market for the widespread use and commercialisation of renewable energy technologies for private sector-driven isolated mini-grid rural electrification in Lesotho via four interrelated components: 1) development of a cornerstone policy, institutional, legal and regulatory framework; 2) baseline data collection and monitoring 3) village-based energisation schemes and 4) outreach programme and dissemination of results. It will focus on renewable energy technologies (PV and/or biomass, hydro and wind, where available) for electricity generation for household use and small income-generating activities, like ice-making, juice/cold drink-vending, powering sewing machines, mobile phone charging, internet cafés, video clubs, etc. This is proposed to be achieved through the participation of the private sector at both afore-mentioned levels. This programme will not only

benefit the rural population, but will also connect financial institutions, technical training and local organisations to promote the establishment of distribution channels to develop the rural electricity market. While project developers may explore the option of hybrid renewable energy/fossil fuel solutions, no GEF project funds can or will be utilised to support the fossil fuel-based component of any hybrid system.

The project consists of four components as outlined below. It is recognised that on-the-job training will be provided by the recruited consultants, both local and international, during the normal course of their support to the relevant project activities and a communication strategy formulated to inform stakeholders on project implementation. Moreover, the project will seek to achieve gender equality through the empowerment of women (e.g. working with women's associations such as the Association of Women in Small Businesses, Boiteko Women's Association, Lesotho National Council of Women, Basali Ntlafatsong (Quthing Development Association), etc.), to fully participate in all project activities and specifically those related to capacity development under the various components. In addition, the project will solicit the participation of NGOs affiliated with the Lesotho Council of NGOs, Technologies for Economic Development, capacity development institutions like the National University of Lesotho, Lerotholi Polytechnic, and Bethel Business and Community Development Centre and others like the Lesotho Solar Energy Society, etc.

The project will support households, through the FSS, with tariff relief, and private investors with an investment grant and PBI, through the DoE, aimed at jump-starting the market for modern energy services for both mini-grids and Energy Centres. Disbursements from the FSS will be made according to a set of criteria to be developed during project implementation.

Component 1: Development of cornerstone SE4All Policies and Strategies to facilitate investment in renewable energy-based mini-grids.

Outcome 1: SE4All cornerstone policies and strategies facilitating (increased) investment in RET deployment, particularly in isolated mini-grids. The project will address specifically those policies and strategies necessary to promote and facilitate private sector investment in isolated mini-grids; as such, these policies/strategies will likely have common ground with the 2013 draft Lesotho Renewable Energy Policy. However, follow-up action on the 2015 Lesotho Energy Policy and the 2013 draft Lesotho Renewable Energy Policy is beyond the scope of this project and, in any case, the former is the subject of on-going discussions regarding EU support to the Government. The expected outputs under this component are:

Output 1.1: Developed and approved SE4All Country Action Agenda (CAA), following extensive stakeholder consultations.

As a first step towards drafting a CAA, Lesotho already implemented in mid-2012 a "Rapid Assessment and Gap Analysis" study that identified the issues and gaps that need to be addressed towards meeting the 3 objectives of the SE4All Initiative in the country with regard to energy access, energy efficiency and renewable energy. The important features that characterise the energy sector in Lesotho are: high dependence on imported fossil fuels for its energy requirements in the transportation and industrial sectors; the dominance of traditional biomass sources in the country's energy mix; low access to modern energy services; and very limited investment in renewable energy and energy efficiency.

On the basis of the "Rapid Assessment and Gap Analysis" report, stakeholder consultations will be required to develop national plans and programmes outlining and prioritising various courses of action. In doing so, the role of energy services in various sectors will be clarified and a determination made on actions required in the area of energy access, energy efficiency and renewable energy to support, in an integrated manner, the attainment of national development goals. The formulation of the CCA will need to be in line with the "Guidelines for Developing National SE4All Action Agendas in Africa" (mandated by the November 2012 African Union Conference of Energy Ministers) and follow the

"SE4All Country Action Agenda Template"[4]. In implementing this activity, support will be sought under the "SE4All Africa Hub" based at AfDB Headquarters. In addition, consultations will be held with neighbouring countries also formulating their CAAs in order to establish synergies and commonality of approach during the process.
In addition, the CAA and Investment Prospectus (IP - see next Output) will need to be fully integrated with the implementation framework of the proposed National Energy Strategy and Policy, and Climate Change Policy, as well as with other sectoral investment plans. Additionally, as part of the CAA/IP drafting process, a decentralized energy services sub-strategy will be developed that will feed into the CAA and IP and ensure that decentralized solutions get incorporated.

Output 1.2: Approved/adopted SE4All Investment Prospectus (IP), following extensive stakeholder consultations. In parallel to the development of the CAA, activities towards achieving this output will include drafting of an IP that provides an approach to operationalizing the CAA by identifying and developing a set of implementable programmes and projects, including their investment requirements, which can be presented to potential private and public investors. The IP will integrate technical, financial, and implementation requirements for achieving a set goal and will delineate the annual funding requirements for capital investments, technical assistance and capacity development over a given time frame. It will also identify policy frameworks or government priorities relevant to reaching these outcomes.

Output 1.3: Strategies and investment plans related to mini-grid applications and village energisation schemes. The strategies will focus on (i) building on the Government's previous and ongoing efforts with regard to institutional, technological and environmental aspects of village energisation schemes, while also addressing the potential constraints, (ii) contributing to scaling up of renewable energy technologies in the country's energy mix, and (iii) piloting different business models to make sure on-grid and off-grid electrification will be implemented in a sustainable manner, including increased private sector participation.

The investment plans, on the other hand, will be geared towards creating conditions that would enable consumers, especially the poor and rural households whose livelihoods are vulnerable to socio-economic and environmental crises, to have access to affordable energy services and investors to enjoy adequate returns on their investments. The investment plans will be designed to enable the implementation of a whole range of innovative investments aimed at promoting various technologies based on renewable energy and they will cover, among others, the preparation of feasibility studies and business plans, establishment of a database of renewable energy equipment, conducting of complementary inventories of the renewable energy potential; setting up of testing and quality control for renewable energy equipment and their installation, capacity development of stakeholders, testing and adaptation of renewable energy technologies to the national context, etc.

Component 2: Baseline energy data collection and monitoring for SE4All.

Outcome 2: Improved capacity of energy stakeholders and government officials for decentralized clean energy planning and decision-making on the basis of quality energy data. The expected outputs are:

Output 2.1: National survey conducted on energy supply, consumption and demand, disaggregated by sector, district and application. The survey will disaggregate by gender and include energy access and intensity baseline data (energy efficiency) as well as penetration and performance of RETs. The last comprehensive assessment of the energy sector situation (energy survey) in Lesotho was carried out in 1985 during the development of the Lesotho Energy Master Plan (LEMP). The LEMP exercise subsequently developed an energy model called the Lesotho Energy Information System (LEIS) which was used as the national energy planning model with projections of supply and demand for energy up to the year 2010, but is no longer in use. Activities towards this output will include the drafting of an energy survey questionnaire and its approval by stakeholders prior to the actual survey being carried out. It will establish a supply and

[4] http://www.se4all.org/wp-content/uploads/2013/10/ActionAgendaTemplate_AfricaHub_01032014.pdf

demand relationship for a base year (2016) by documenting the existing flow pattern of energy use (energy balance sheet) in Lesotho from energy sources through any conversion processes to the final point of consumption. In addition, the survey will need to include those efforts from other government departments involving, health, rural water supplies and education which have a rural energy component, so as to ensure effective coordination and synergies to provide an integrated energy and social services delivery strategy to the rural and remote areas.

Output 2.2: Energy database and information system established for data collected under Output 2.1 above, with clear responsibilities agreed to as regards regular monitoring and annual publication of indicators (between DoE and BoS). This database will be utilised both for planning purposes as well as for tracking progress against national and SE4All targets. Obtaining quality data is not just a matter of collecting, storing, and accessing it; to be useful and informative, the data needs to be structured, cleaned, aggregated, and then visualized to allow it to be exploited/interpreted for making informed decisions. Several energy databases (e.g. Intuit's QuickBase, NREL's Databus) can be used to collect, store, share and manage massive amounts of energy-related data at very short intervals for analysis and creation of required reports. They also build in flexibility to add new types of information, should it be required. These databases will be reviewed and a selection made on the most appropriate one for the Lesotho context and training on its efficient use will be provided to DoE and BoS staff. Support will also be provided to the staff in the utilisation of GeoSIM, a GIS-based software designed for creating highly interactive rural electrification planning scenarios. GeoSIM consists of 4 main modules and its decentralised supply options module allows for determining the best options to supply electricity to isolated off-grid areas.

Output 2.3: Energy modelling software in place to analyse the data, model scenarios and produce information that will promote RE policies. The software should also incorporate a monitoring, reporting and verification (MRV) system to enable tracking of GHG emission reductions. Various energy system models in use in developing countries (e.g. EFOM-ENV, MARKAL, MESSAGE, Integrated EFOM-MARKAL, LEAP, WASP, etc.) will be reviewed and the most appropriate one will be procured, and adapted if need be, for use by DoE and BoS. Training will be provided to personnel of these institutions in the proper use of the software to analyse data and model scenarios that will assist in policy formulation. Activities under this output will be coordinated with the capacity development support being provided by IAEA to BoS' Environment & Energy Statistics Division and DoE's Energy Planning Unit under the on-going project entitled "Enhancing the Energy Databank and Building Human Capacity to Support the Energy Policy Framework".

Output 2.4: All energy-related data and plans in the country harmonized with the proposed National Energy Policy and New Climate Change Strategy, and in adherence with a standardized GHG emissions tracking system. This harmonisation will take place when these two frameworks will be in place (it is understood that their formulation has not commenced yet). However, it is imperative that the energy modelling software be user-friendly and that effective capacity development be provided through "training of local trainers" to ensure that comprehensive data collection and processing continue on a regular basis under a long-term scenario.

Component 3: Village-based energisation schemes.

Outcome 3: Successful establishment of a village-based energy service delivery model for replication nationally. The expected outputs are:

Output 3.1: Completed pre-feasibility studies for mini-grids in 20 village communities (see Table 3 below) spanning 5 of Lesotho's 10 districts. The objective of the pre-feasibility studies is to undertake a preliminary assessment, not yet at the engineering level, to ascertain whether the potential project makes basic economic sense. They entail determining the renewable energy resources available for development in the particular village, the need for any further evaluation of the RET potential, the location of sites for the mini-grid (and thermal services, where appropriate), study of infrastructures and socio-economic factors in the village, etc. The pre-feasibility studies will provide all the information necessary to enable the project to determine which of the 10 village communities present the best options for the establishment of mini-grids, while the remaining 10 villages will have Energy Centres.

Output 3.2: Operational mini-grids in 10 village communities and 10 Energy Centres in the 5 identified districts, viz; Mohale's Hoek, Mokhotlong, Thaba-Tseka, Qacha's Nek and Quthing. After completion of the pre-feasibility studies in the 20 villages, a competitive bidding process will be launched seeking private sector interest in establishing mini-grids in 10 of them and Energy Centres (EC) in the remaining 10 villages. The solicitation will indicate that the project will provide financial incentives to investors in each of the 2 categories of mini-grids and Energy Centres and those bidders with solid proposals and requiring the least subsidy will be selected for the next step in the process, viz. preparing the full feasibility studies and business plans.

The feasibility study will include technical (technical characteristics, load distances, market analysis), economic (economic parameters and project economics), financial (cash flow, internal rate of return/return on investment) and environmental (environmental impact assessment) considerations. Following this, the project will undertake an evaluation of the proposals received to select 10 villages for mini-grids and the remaining 10 villages for ECs. Then, the next step will be the actual construction of the mini-grids and Energy Centres, followed by putting them into operation.

Output 3.3: It is expected that capitalisation of the proposed Facility for Rural Electrification (FREA) funded by the EU under the 11th EDF (see below under "Other non-GEF-related Initiatives") will materialise within the 5-year lifetime of the present project. Thus, in parallel with activities implemented under Output 3.2 above, the project will identify 50 additional sites for the construction of mini-grids and 10 additional sites for Energy Centres, and secure the interest of the private sector to develop these sites. As per this phased approach, these additional sites will get developed post-project with financing from FREA.

Output 3.4: Capacity of national and district-level energy officials developed on best practices and opportunities for decentralized village energisation models in off-grid areas. Training will be provided to the local stakeholders on how to utilise the criteria and guidelines developed under the project to technically appraise projects and the amount of subsidy to be provided to project developers. This will include capacity development to familiarise them with system sizing and optimisation tools (e.g. HOMER, JEDI and/or RETSCREEN computer models) for evaluating system design options.

During implementation of this Component, the project will sensitise and train national and district-level energy officials on best practices and opportunities for decentralized rural energisation models in off-grid areas. It will also work with the Department of Standards and Quality Assurance (DSQA) of the Ministry of Trade and Industry to ensure that only quality RET products that meet approved standards are allowed for importation and installation in the country.

Output 3.5: Financial Support Scheme established to support private sector investment in village-based energisation through mini-grids/Energy Centres. In order to facilitate the uptake of renewable energy-based rural mini-grids, thus minimising the financial risks to investors and lenders alike, the project will establish a Financial Support Scheme (FSS) that will consist of $ 1.2 million ($ 1.0 million from GEF and $ 0.2 million from UNDP) that will be available to private sector investors to: (i) Serve as a performance-based incentive (PBI) fund (a subsidy that is also referred to as OBA – output-based aid) that will be paid directly to them, through the DoE, based on actual energy production of the renewable energy system installed; (b) Support the preparation of feasibility studies/business plans (FS/BP) and partial investment for 10 isolated renewable energy-based mini-grids; and (c) Support the establishment of 10 Energy Centres, with each serving some 5 surrounding villages.

Identification of Target Villages

The villages to be selected for mini-grid energisation and Energy Centres will need to meet on, the one hand, the conditions of being attractive to the private sector for investment by providing a market large enough to make the business model viable and, on the other hand, assist the potential consumers with choices/options for modern energy services. The objective is to create a win-win situation for consumers to enjoy the benefits of modern energy services for the improvement of their quality of life and for income-generating activities, while, simultaneously, allowing investors to make sound business investments that will ensure the sustainability of operations. In response to these

considerations, a careful and thorough evaluation of potential villages was undertaken during the implementation of the PPG in order to deliver both social and economic benefits to potential consumers, as well as to boost investment by the private sector.

Appropriate sites for renewable mini-grid implementation were identified through direct consultation with key institutions - Government (Department of Energy, Bureau of Statistics and Local Government, in particular Principal Chiefs of the 5 districts), private sector, non-governmental organisations, and potential consumers. The selection criteria in Table 3 below were developed, discussed with the stakeholders and utilised during discussions with Principal Chiefs and village representatives. Once criteria for the selection of villages have been approved, they should be strictly enforced and should not be left to interpretation by stakeholders. The final selection of villages will have to be approved by the Project Board.

	Category	Parameters	Notes
1	Location of installation.	(a) Distance to existing grid power source. (b) Transmission distance based on population distribution (dense or sparse). (c) Accessibility and topography (terrain.)	No planned grid and off-grid electrification in the area for at least 5 years. Site should be more than 30 km from an existing or planned power source *(depending on the load to be supplied, extending a line from a power source within a radius of 30 km may prove to be a cheaper solution than establishing a mini-grid).* Does the site offer a long-term opportunity to realise returns on investment and measure impact on communities? The units to be connected (households, institutions, commercial premises, etc.) should be in close proximity to one another (*It is most convenient if the area to be served is within a radius of 600 metres, thus eliminating the need for step-up transformers*). The site should be accessible throughout the year regardless of the weather and resulting road conditions, and must have proximity to transportation routes that can support heavy loads during construction. Selection of villages with difficult road access during the pilot phase may compromise the project's success.
2	Productivity	The site should present potential for productive uses by small entrepreneurs, SMEs, etc.	Potential for SMEs. Agricultural potential, etc.
3	Payment for services	For the project to be economically viable, the potential power consumers should demonstrate: **Ability to pay**: i) Prevailing economic activities.	It is important to gauge the ability, willingness and reliability of customers to make payments to cover services costs. Supply and demand balancing (*after estimating the overall ability to pay for electricity, an additional intricacy is the gauging of potential levels of use at various prices per unit of electricity, pricing too low could lead to excessive*

		ii) Disposable income. ii) Percentage of the population engaged in economically productive activities. **Willingness to pay:** i) Current expenditures on power/energy. ii) Quality of current power/energy sources. iii) Desire or need to consume quality power.	*demand, whereas pricing too high could lead to non-payment or non-use*). Lack of information about electricity supply could also lead to misuse.
4	Magnitude of potential power consumers	The generated power must be consumed in order to provide positive social, environmental and economic impact.	Alignment of community expectations. The categories of potential consumers may include, households (general density of >50 households/km² in clusters), businesses, institutions, administrative units, development organisations, etc.
5	Secure generation site	Cattle rustling, clashes, vandalism, theft, etc.	Security is a vital factor in site selection. Secure areas can be implemented faster and require no special planning on how to counter or prevent insecurity occurrences.

Table 3: Criteria for village selection

The following questions were included during the process of soliciting information from district/village representatives: In your district, which 4 villages (total of 20 villages for all 5 districts):
(a) Are far from the national grid (more than 30 km, as extending the grid beyond this distance becomes prohibitively expensive)?
(b) Are accessible by road, preferably throughout the year?
(c) Have relatively larger population densities?
(d) Have existing or potential for economic activities such as cottage industries, tourism, etc.?
(e) Have schools, business units, social institutions, administrative units (e.g. police post, local government office, post office, youth centres, etc.)?
(f) Have development organizations?
(g) Have relatively low theft rate?

The villages in the selected five mountainous districts of Lesotho (viz; Mohale's Hoek, Mokhotlong, Thaba-Tseka, Qacha's Nek and Quthing), although difficult and expensive to reach by grid extension, are also generally rich in at least one renewable energy resource: high solar radiation, good wind speeds and/or proximity to rivers with sufficient heads for run-of-the-river hydropower stations. However, it is understood that these villages constitute a preliminary list that may be subject to change during project implementation, depending on the interest of and confirmation by the stakeholders.

In discussions with private sector investors during the process of selecting the villages, they expressed concern regarding the risk of an uncompensated 'takeover' by an expanding grid. Thus, there will be a need for regulations and procedures clarifying what will happen to the mini-grid when the national grid arrives, so that the timing and location thereof can be adequately incorporated into mini-grid technical and financial design. The best approach will be to manage these risks upfront, with a regulatory framework that protects investors, guarantees fair compensation, and - ideally - offers

transparent information about grid extension plans (created through a rural electrification plan). Under a positive policy environment, grid connection can instead provide the opportunity for isolated mini-grid operators to retain their business and earn income by selling the electricity produced to the grid.

Information on the potential 20 villages (four per District) is summarised in Table 4 below. It is assumed, on the basis of information gathered during the PPG, that the first 2 villages listed in each District will be good candidates for mini-grids, with the remaining 2 villages per District will have Energy Centres. However, a final decision for each district will be made once the pre-feasibility studies for all villages have been completed. Procedures will then be developed regarding a transparent and competitive process on the "award" of villages to the private sector for development.

Table 4: Information on potential villages for mini-grids/Energy Centres.

Notes:

- For villages not visited, information was obtained by telephone from area chiefs, local councillors, and individual villages and the Census 2006 Village List (http://www.bos.gov.ls/)
- In making power requirements estimations, the following assumptions were made:
  - The availability of electricity will lead to the installation of 1 – 2 hammer (grinding) mills in each village, depending on its population size. These are likely to operate up to 2 hours in summer and up of 5 hours in winter. Income-generating activities include ice-making, juice/cold drink-vending, powering sewing machines, mobile phone charging, internet cafés, video clubs, etc.
  - In each village, 15% - 20% of the households are likely to purchase refrigerators and television sets in the first two and half years.
  - Each school is likely to purchase 10 computers and 1 television set. The availability of electricity may also entice large companies to donate computers to the rural schools, as part of their corporate social responsibility.
- Following completion of pre-feasibility studies in all 20 villages, the choice of villages for mini-grids and ECs may differ from what is indicated in the Table below.

	District	**Village**	**No. of potential households (HH)**	**Expected Take-up Level (%)**	**Estimated daily electricity requirements/ Energy Source:**	**Electricity services to be utilised for:**	**Other potential consumers (e.g. Post Offices, Police Stations, Schools, Stores, etc.) to be served**
1	Mohale's Hoek	Ketane (Ha Nohana)	More than 180	60 – 70	52 kWh. 5-kW micro-hydro (Ketane river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Post office, clinic, police post, primary school, community council, supermarket, 5 medium size shops, church, hammer mill.
2		Ribaneng	More than 250	70 – 80	65 kWh. 5-kW micro-hydro (Ribaneng river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	6 medium size shops, clinic, 2 primary schools, Independent Electoral Commission, sizeable number of mines and RSA workers, community council; street lighting, hammer mill.
3		Phamong (Central)	Energy Centre to service the following neighbouring villages: Phamong (Moreneng), Ha Putsoane, Ha Qacha, Ha Malephane. Ha Lempe, Ha Lephena (> 350 households)				
4		Koebunyane	Energy Centre to service the following neighbouring villages: Ha Ntoane, Ha Lechesa (Khubetsoana, Kerekeng), Ha Tšolo, Motsekuoa, Ha Liau, Ha Nonyane Ha Rankhoba, Taung, (> 350 households)				

	Mokhotlong						
5		Matsoaing	More than 200	60 – 70	52 kWh. 12 kW PV	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Clinic, primary school, 5 medium-sized shops, community council, hammer mill.
6		Tlhanyaku	More than 200	60 – 70	52 kWh. 5-kW micro-hydro (Senqu river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Large clinic, air-strip, hardware centre, 5 medium-size shops, area chief's residence, community council, 2 hammer mills.
7		Mateanong	Energy Centre to service the following neighbouring villages: Liqobong, Nazareth, Ha Jorose, Ha Lefatla, Malapane, Sekokong (> 250 households)				
8		Malingoaneng	Energy Centre to service the following neighbouring villages: Tloha-re-bue, Malingoaneng, Makhiseng, St.Martins Mahaoleng, Makhiseng (approximately 250 households)				
	Qacha's Nek						
9		Sehlabathebe (Mpharane)	More than 180	70	60 kWh. 5 kW micro-hydro (Leqooa river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Police post, supermarket, more than 10 medium size shops, large clinic, National Park, post office, community council, Independent Electoral Commission, secondary school, primary school
10		Lebakeng	More than 300	70	65 kWh. 5 kW micro-hydro (Lebakeng/Senqu river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Clinic, 2 primary schools, 5 medium-sized shops, community council, hammer mill.
11		Matebeng (Ha Lelignoana)	Energy Centre to service the following neighbouring villages: Ha Tebalo, Maphotong, Ha Mofolo, Ha Nkofo, Mozamaqa (approximately 250 households)				
12		Melikane (Thuoeleng)	Energy Centre to service the following neighbouring villages: Mahooeng, Ha Khanya, Ha Chale, Ha Dudumayo, Likileng, (approximately 100 households)				
13		Tosing (Dalewe)	More than 200	70	65 kWh. 5 kW micro-hydro (Sebapala river)	Lighting, cell-phone charging, radio, TV,	5 medium size shops, clinic, 3 primary schools, agriculture

	Quthing					income-generating activities, computer(s), etc.	extension, 2 woolsheds, Independent Electoral Commission, sizeable number of migrant workers, community council, MP residence, guest house, area chief residence and office, street lighting, hammer mill.
14		Sebapala (Ha Sempe/Lefikeng)	More than 200	70	60 kWh. 5 kW micro-hydro (Sebapala river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	6 medium size shops, church, guest house, Secondary, 2 primary schools, principal chief's residence & office, sizable number of migrant workers, hammer mill.
15		Kubung (Ha Majara)	Energy Centre to service the following neighbouring villages: Ha Majara, Ha Bokoro, Ha Mapena, Ha Matlali, Makhetheng (> 300 households)				
16		Qhoali	Energy Centre to service the following neighbouring villages: Ha Mokoena, Ha Motšoane, Ha Lesholu, Makhetheng, Phookeng, Sekokoaneng, Ha Field, Kubung, Mantsoepa (> 450 households)				
17	Thaba-Tseka	Sehong-hong	More than 250	70 – 80	65 kW. 5 kW micro-hydro (Sehong-hong /Senqu river)	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Post office, clinic, police post, primary school, high school, community council, 2 supermarkets, 5 medium size shops, church, Agriculture Extension, bars, hammer mill, woolshed.
18		Mashai (Moreneng, St. Theresa)	More than 200	70 – 80	60 kWh. 14 kW PV	Lighting, cell-phone charging, radio, TV, income-generating activities, computer(s), etc.	Clinic, 2 primary schools, high school, community council office, 6 medium size shops, church, guest house, bars, hammer mill,
19		Linakaneng	Energy Centre to service the following neighbouring villages: Ha Matjota, Makanyaneng, Mankeng, Chesalaene, Linakeng, Ha Setai, Bokhoasa, Ha Kueli, Pae-la-ithlatsoa, Ha Soai, Manamaneng (>450 households)				
20		Ha Mokoto (Litsoetseng)	Energy Centre to service the following neighbouring villages: Setanteng, Makoabating, Ha Ramatšiliso, Pharahlahla, Sehaula, Ha Lekholoane, Taung, Bocheletsane (>400 households)				

During the course of the scheduled project mid-term review, an assessment of the FSS will be undertaken to ensure that it is performing as planned, including the gradual decrease of the investment grant and its eventual phase-out over time. The mid-term review will also ascertain the level of support, if any, that future project developers may require beyond completion of the project, while capitalising on the momentum that it has generated.

Component 4: Outreach programme and dissemination of results.

Outcome 4: Outreach programme and dissemination of project experience/best practices/lessons learned for replication nationally and throughout the region. The expected outputs are:

Output 4.1: National Plan to implement outreach/promotional activities targeting both domestic and international investors. This will include the preparation of promotional materials, briefing sessions with investors who are already active in the energy/renewable energy field in the country, local businesses that have interest in expanding their activities to include energy for the rural areas and, potentially, organising road shows to attract foreign investors to establish consortia with local businesses to provide the rural areas with modern energy services.

Output 4.2: Capacity development of concerned Ministries/Institutions to monitor and document project experience. On-the-job training will be provided by international/local consultants, during the course of their inputs and at mid-term project review/terminal evaluation, to the stakeholders on how to monitor, record/document project experience.

Output 4.3: Published materials (including video) and informational meetings with stakeholders on project experience/best practices and lessons learned. These materials, in electronic form, will be widely disseminated throughout the region and among those countries planning to implement similar renewable energy-based mini-grids for rural electrification. They will also be posted on the project website.

Output 4.4: Lessons learned and results dissemination workshop(s). In addition, towards completion of project activities, a workshop involving the participation of all in-country stakeholders and international participants will be organised to discuss lessons learned and next steps towards replication of results throughout the country/region.

KEY INDICATORS, ASSUMPTIONS AND RISKS

Indicators

Key indicators of the project's success will include:

- 10 mini-grids and 10 Energy Centres operational and providing modern energy services to 1,000 rural households, each consisting of an average of 6 persons.
- An additional 50 mini-grids and 10 Energy Centres developed immediate post-project operational and providing modern energy services to 3,000 rural households.
- Direct project and immediate post-project CO_2 emissions avoided by 213,680 tonnes, under the assumption of a 20-year equipment projected life.
- Indirect post-project CO_2 emissions avoided by 641,040 tonnes, applying a replication factor of 3.
- Capacity developed within Department of Energy, Bureau of Statistics and other relevant Ministries/ Government Departments to promote investment in renewable energy-based isolated mini-grids for rural electrification.
- 225 jobs created in the mini-grids/Energy Centres sector and 900 more jobs in income-generating activities during the project/immediate post-project period.
- Lessons learned documented and distributed to potential investors/stakeholders through publications, public awareness campaigns and the project website.

Detailed indicators are provided in the Project Results Framework below.

Assumptions

The assumptions are outlined in the Project Results Framework below.

Risks

The project presents some risks which are discussed in the Table 5 below:

Table 5: Risks, Rating and Impact/Mitigation Approach

Risks	Rating	Impact/Mitigation Approach
Policy: Framework to encourage the private sector to invest in renewable energy-based rural energy services.	High	There exists the possibility that the Government may not act soon enough on a policy framework that will encourage the private sector to invest in renewable energy-based rural energy services; as examples, the 2003 Energy Policy and the 2013 Renewable Energy Policy have been in draft form for quite some time. If this were to happen, project implementation will get hampered. However, the Government is strongly motivated to provide access to modernised energy services to the large rural population that utilises traditional forms of energy, to improve their quality of life and for income-generating activities, and is driven by its plans to meet both the objectives of the Lesotho Vision 2020 and the S4All Initiative. Towards this end, it only very recently approved the new 2015 Energy Policy, thus sending the right signal to stakeholders. With regard to the 2013 Renewable Energy Policy, it is still in draft form. However, the donor community will work with the newly-installed Government to have the right policy in place and preliminary indications are that this may materialise sooner, rather than later. Moreover, project interventions under Component 1 will assist in mitigating this risk.
Institutional: Dependence on SAPP imports could increase or become more attractive relative to development of the country's indigenous RETs.	Moderate	The risk of continued dependence on electricity imports from the South African Power Pool, mainly based on coal generation, will remain in border areas, to the detriment of renewable energy based decentralised options. However, this does not pose a risk deep inside the country, as stringing long electricity lines does not make economic sense due to the small loads and difficult terrain. Moreover, this risk will be mitigated by the fact that, as per existing projections (ref. Southern African Power Pool: Planning and Prospects for Renewable Energy, IRENA 2013) which indicate that "the share of renewable technologies in electricity production in the South African Power Pool region could increase from the current level of 10% to as high as 46% in 2030".
Financial: SE4All funding resources may not materialize, thus making the CAA and IP of little use.	Moderate	If this were to happen, it will provide a set-back in the development of RETs in the country, as the project does not have leverage over the high-level global commitments and funding mechanisms established as part of SE4All. However, indications from the country action process developed by the SE4All Secretariat are that those countries that expeditiously complete their CAA and IP documents will be prioritized as regards access to dedicated SE4All funds when and if they materialize. Project interventions under Component 4 will assist in mitigating this risk by targeting both domestic and international investors.
Poor investment climate.	Moderate	The fact that Lesotho ranks in the 128th place in "Ease of doing Business", as per the WB/IFC "Doing Business 2015" publication and 115th in enforcing contracts might act as a deterrent for investors in RETs, although these have not tempered

		investors' willingness to invest in the garment industry to benefit from business opportunities available under AGOA. With this in mind, the project will put in place a Financial Support Scheme that will be directed at minimising the financial risks that lenders and investors may face in doing business targeting RETs for the rural areas.
Technology: Renewable energy equipment of poor quality introduced in the country.	Moderate	Poor quality of equipment and shoddy installation have been shown to have plagued some SHS in Lesotho. Hence, the Government will put in place, through the Department of Standards and Quality Assurance (DSQA), strict controls on the standards of renewable energy equipment that can be imported and installed in the country. In addition, the Government will ensure that all installations and maintenance should be undertaken only by licensed and certified technicians as per established electricity codes.
Environmental/ Climate Change.	Moderate	There are multiple environmental risks, as outlined in Lesotho's Second National Communication to UNFCCC (e.g. reduced rainfall that can affect water flows, land and watershed degradation due to erosion and population pressures) that can affect energy planning and infrastructure investments. These are being and will continue to be addressed through capacity development of Government staff on the key aspects to address national challenges associated with weather, climate and climate change.

FINANCIAL MODALITY

The project is aimed at policy development, capacity building, technical assistance and the provision of financial incentives to catalyse private sector investment in the development and utilisation of renewable energy-based mini-grids for rural electrification. A substantial portion of GEF climate change resources will be allocated to a Financial Support Scheme (FSS) that would aim at jumpstarting the market through the provision of financial incentives. The FSS will be initially capitalised in the amount of $ 1,000,000 from GEF funds and $ 200,000 from UNDP *the total grants provided to recipient organizations will not exceed $300,000 as per the UNDP Guidance on Micro-Capital Grants*). The FSS will constitute a grant mechanism and the funds will be deposited with and managed by LEWA that, as indicated above, already manages an annual $ 2 - 3 million Universal Access Fund. The funds themselves will be utilised to cover the initial investment subsidy and performance-based incentive that will support project developers.

The project objective will be attained through technical assistance and facilitating third parties' investment in renewable energy-based mini-grids for rural electrification. No loan or revolving-fund mechanisms with GEF funds are considered appropriate, and, therefore, grant-type funding is considered as the most suitable to enable successful delivery of the project outcomes.

GHG CALCULATIONS

The project is expected to be approved in time to commence activities in late 2015/early 2016. Under this assumption, activities addressing the policy and regulatory issues should be completed within the first year of project activities (Year 1 of project), including regulations and procedures for the private sector to participate in the electricity sub-sector, model contracts for rural mini-grids and tariffs to be charged to consumers. Under this scenario, it is also assumed that 2 renewable energy mini-grids will be established during Year 2, 4 in Year 3 and the remaining 4 during Year 4. With regard to the Energy Centres, it is assumed that 3 of them will be established during Year 2 of the project,

another 3 during Year 3 and the remaining 4 established during Year 4. Hence, by the start of Year 5 of the project, all 10 mini-grids and 10 Energy Centres should be operational. In addition, the final year (Year 5) of the project will be devoted to consolidating the gains and momentum generated during the prior years to expand the rural mini-grid/EC programme. An installation/establishment schedule for the mini-grids and Energy Centres is provided in Table 6 below.

District	Village	Year 2	Year 3	Year 4
Mohale's Hoek	Ketane, 5 kW MHMG.	✓		
	Ribaneng, 15 kW PVMG.		✓	
	Koebunyane, EC		•	
	Phamong, EC			•
Mokotlong	Matsoaing, 12 kW PVMG.		✓	
	Tlhyanaku, 5 kW MHMG.			✓
	Mahaoleng, EC	•		
	Mateanong, EC		•	
Qacha's Neck	Sehlabathebe, 5 kW MHMG.	✓		
	Lebakeng, 5 kW MHMG.			✓
	Matebeng, EC	•		
	Melikane, EC			•
Quthing	Tosing, 5 kW MHMG.		✓	
	Sebapala, 5 kW MHMG.			✓
	Kubung, EC		•	
	Qhoali, EC			•
Thaba-Tseka	Sehong-hong, 5 kW MHMG.		✓	
	Mashai, 14 kW PVMG.			✓
	Linakaneng, EC	•		
	Ha Mokoto, EC			•

EC: Energy Centre MHMG: Micro-hydro mini-grid PVMG: PV mini-grid

Table 6: Installation/Establishment Schedule at-a-glance.

Theoretically, the micro-hydro power stations have the capacity to operate 24 hrs/day, under the assumption that electricity will be required round the clock. However, for purposes of computing GHG emissions, it will be assumed that the micro-hydro power stations will only operate during 12 hrs/day and have 85% availability (downtime of 15% related to stoppages for maintenance/repair); PV systems, as indicated earlier, will generate 6 kWh/kW/day and are also assumed to have 85% availability. As per the above schedule, electricity generation per village over the project duration from Year 2 through Year 4 (no equipment would have been installed during Year 1) will be as follows:

District	Village	Year 2 (kWh)	Year 3 (KWh)	Year 4 (kWh)	Subsequent Years (kWh/yr)
	Ketane, 5 kW MHMG.	9,308	18,615	18,615	18,615

Mohale's Hoek	Ribaneng, 15 kW PVMG.	-	13,961	27,923	27,923
Mokotlong	Matsoaing, 12 kW PVMG.	-	11,169	26,280	26,280
	Tlhyanaku, 5 kW MHMG.	-	-	9,308	18,615
Qacha's Neck	Sehlabathebe, 5 kW MHMG.	9,308	18,615	18,615	18,615
	Lebakeng, 5 kW MHMG.	-	-	9,308	18,615
Quthing	Tosing, 5 kW MHMG.	-	9,308	18,615	18,615
	Sebapala, 5 kW MHMG.	-	-	9,308	18,615
Thaba-Tseka	Sehong-hong, 5 kW MHMG.	-	9,308	18,615	18,615
	Mashai, 14 kW PVMG.	-	-	13,031	26,061
Total		18,616	80,976	169,618	210,509

Table 7: Electricity generation over project duration

As per Table 7 above, by project completion, some 269 MWh (sum of Years 2, 3 and 4) would have been generated and an annual generation of 211 MWh will be sustained over an expected 20-year projected life of the equipment; this scenario does not make any allocation for additional mini-grids that could be installed during the project timeframe, utilising the momentum generated by the project. All this renewable energy generation, if not implemented, would have otherwise been accomplished through diesel power generation burning imported fuel, with an emission factor of 0.875 tCO_2/MWh (Ref. Second National Communication to UNFCCC). Consequently, during the 5-year project period, slightly over 235 tonnes of CO_2 would have been avoided as a direct result of renewable energy-based electricity generation. Furthermore, 185 tonnes of CO_2/year would continue to be avoided annually over the remaining almost 18 years of useful life of the equipment. Thus, the total direct emission reduction, without replication, over a 20-year projected equipment life will be 3,565 tCO_2 (235 tonnes + 18 years x 185 tonnes/year).

The 10 mini-grids to be developed during the 5-year project timeframe range between 5 kW and 15 kW in installed capacity, with the capacity at each site determined on the basis of anticipated consumer demand for electricity services. It is recognised that the demand for these services will gradually increase over time and this will be facilitated by the modular configurations of both the PV and mini-hydro installations that lend themselves to the addition of increased capacities related to the growth in demand. This "scaling-up" is expected to reach an average of 100 kW of renewable energy-based installed capacity per site/mini-grid covering an additional 50 villages over the years immediately following the project period, i.e. during the immediate post-project period. With regard to the Energy Centres (EC), it is expected that "scaling-up" will result in an additional 10 ECs being established post-project.

Hence, on the understanding that the additional 50 mini-grids will become operational immediately post-project, under the assumption that FREA will be capitalised during the project, and extrapolating from the average of 18.5 tonnes of CO_2/year avoided per site (on the basis of the 10 sites to be developed during the project timeframe) it is estimated that some 185,000 tonnes of CO_2 will be avoided as direct post-project GHG impact over the 20-year lifetime of the

installed equipment (18.5 tonnes of CO_2/year/10kW average installation at each site x 10 (to account for 100 kW installation/site) x 50 sites x 20-year lifetime of the installed equipment).

Each Energy Centre (EC) will service 5 neighbouring villages totalling around 400 households (hh), 95% of whom use paraffin (kerosene) or candles for lighting (ref. page 7 above). For the targeted 20 ECs (10 ECs during the project + another 10 ECs immediate post-project) in total, that would represent 7,600 (400 hh x 0.95 x 20 ECs) households who can potentially benefit by replacing paraffin use with solar lanterns. Using figures provided in the Emissions Reduction Profile for Lesotho prepared by UNEP Risoe, some 3,600 tCO_2 would be avoided per year [7,600 hh x 0.5 litres x 2.6kgCO_2/litre x 365 days/1,000]. With an expected lifetime of 5 years for solar lanterns, the total amount of GHG avoided will be 18,000 tCO_2. Improved cook stoves would result in about 1,423 tCO_2 avoided per year, resulting in a total of 7,115 tCO_2 over the 5-year lifetime of improved cook stoves (ref. page 24 above).

In light of the above, a total of 213,680 tonnes of CO_2 will be abated during the project/immediate post-project period, resulting in a direct abatement cost $ 16/tonne of CO_2. In this connection, Renewable Energy World reported in March 2016 the following on the Social Cost of Carbon: "The (New York) PSC (Public Service Commission) determined that the best way to value avoided carbon emissions is by using the Social Cost of Carbon, which measures the overall cost to society from each ton of Carbon Dioxide (CO_2) emitted, and as of 2015, it costs society about $ 40 per ton".

Finally, under the assumption of great interest generated in renewable energy-based mini-grids during project implementation and given a conducive environment for investment that the project would have created, it is highly likely that many more such mini-grids will be built over a post-project period of 10 years, exceeding by several times the number installed during the 5-year project and immediate post-project implementation; this is especially so in view of the expression of interest from donors to promote implementation of scaling-up in case of successful results achieved under this project. Thus, in the case of the bottom-up approach, with a replication factor of 3, the indirect post-project emission avoided would be 641,040 tonnes of CO_2.

Table 8: Project GHG emission reduction impacts

Time-frame	Direct project/immediate post-project (20-year equipment projected life).	Indirect post-project (bottom-up) over next 10 years of project influence.
Total CO_2 emissions reduced (tonnes)	213,680	641,040

COST-EFFECTIVENESS

As indicated earlier, the Government is cognisant of the fact that it is an unsurmountable task to serve the un-electrified 91.35% of the country's rural population through grid extension because of the high costs associated with the construction of electricity distribution lines in a mountainous terrain. In addition, simply trying to do this at the present time would add to more electricity being imported from South Africa (through coal generation)/Mozambique, unless massive investments are made in developing the country's abundance of hydropower resources. Even then, the cost of stringing the lines through difficult terrain to every single village will be prohibitive. Consequently, there is a keen awareness among decision makers of the need to shift towards more decentralised, sustainable and modern forms of renewable energy-based systems for the much dispersed rural areas in terms of cooking, lighting and heating during the winter months.

The recent experience with solar home systems (SHS) in the country under the LREBRE project did not give much hope to the Government to pursue that route for decentralised electricity services. As pointed out during the PPG inception workshop, "SHS are not the solution for Lesotho; the objective should be to sell a service, not a technology".

As stringing of lines to the bulk of the unelectrified rural population will be extremely expensive, the other options would be to use imported diesel or localy-available renewable energy sources (biomass, hydro solar and wind, where available), to power isolated mini-grids. However, in the case of diesel, delivery of fuel will pose a probem due to the mountaineous terrain, as evidenced in the case of the installed 5x50 kVA diesel generator sets in Ketane that never went into operation due to the difficult terrain for diesel fuel transportation, the very high cost in fuel delivery (approx. $ 140/barrel) and the absence of locally available capacity to operate and maintain it. Hence, the only viable alternative is for the Government to implement the renewable energy option through mini-grids and to promote the use of modern energy appliances/technologies at multiple Energy Centres in the various districts.

With regard to electricity generation costs in the country, LHDA generates electricity from hydropower at 1.1 US Cents/kWh, while the purchase price from South Africa is 7.2 US Cents/kWh and 12 US Cents/kWh from Mozambique, including wheeling charges. Regarding diesel generation cost in the country, the Semonkong case shows that its generation at this isolated hybrid hydro/diesel power station is 62 US Cents/kWh. Electricity generation costs from PV for mini-grids are not available in Lesotho; however, as a reference, the average feed-in-tariff is 30 - 35 US Cents/kWh in Kenya, Tanzania and Uganda for PV mini-grids, indicating that it would be around that range in the country as well.

As indicated above, the direct project and immediate post-project emissions reduction with replication over next 20 years of project influence will amount to 213,680 tonnes of CO_2 avoided, which translates into an abatement cost of $ 16 of GEF funds per tCO_2 reduced. On an annual basis, as part of the PIR reporting process, the project will examine the costs of mini-grids compared to household-level solar powered systems and products, with a view to determining whether the latter may be more cost-effective in terms of expanding energy access to more people in a shorter period of time.

SUSTAINABILITY

From a technical point of view, the viability of tapping renewable energy, either individually or in a hybrid configuration with a non-renewable source, for rural electrification has now been demonstrated in several developing countries, including some located in Africa. By addressing the non-technical barriers that impede the development of renewable energy-based mini-grids in Lesotho, the project will assist in creating a sustainable niche through strengthening the policy, institutional, legal, regulatory and operational capabilities of the key national institutions, supporting the development of the technology through a market-driven approach, developing national capabilities and disseminating information. These efforts should ensure the long-term sustainability of renewable energy-based mini-grids for rural electrification in the country.

From a financial point of view, the project will support the integration of local manpower and industries into the renewable energy mini-grid sector. This will be achieved through the provision of focused support to households willing to venture into small income-generating activities utilising electricity, capacity development of technical personnel and local specialised engineering workshops for manufacturing the required ancillary supporting equipment and engineering firms in the design, construction, installation, operation, maintenance and repair of the renewable energy-based systems. With the increase over time in renewable energy-based mini-grid installations, it is envisaged that such efforts will intensify with opportunities for job creation with additional players entering this field.

REPLICABILITY

The Project's potential for replicability within the country is very good in view of the fact that 91.35% of the rural population does not have access to electricity or modernised energy services. This represents 1.39 million of Lesotho's population in 2014 and constitutes over 230,000 households. The project will adopt a bottom-up approach within the overall policy/investment framework that is envisaged to be developed to promote renewable energy-based mini-grids for rural electrification. Technical assistance for barrier removal and institutional strengthening to be provided under

the project will facilitate such replicability since it will create the required institutional, policy and technical conditions to enable the generation of renewed investor interest for the development of additional projects in this field. Moreover, the lessons learned will be of great value to the neighbouring countries sharing a similar resource base, should they decide to tap into their respective renewable energy resource base for isolated mini-grid rural electrification.

COORDINATION WITH OTHER GEF-RELATED INITIATIVES

- Reducing vulnerability from climate change in the Foothills, Lowlands and the Lower Senqu River Basin: This LDCF-financed project (GEF funding: $ 8.4 million; Project duration: 6 years) will contribute towards strengthening institutional and technical capacities of government institutions to plan for and implement adaptation using an ecosystem management approach. In particular, the project will: i) develop a geo-based climatic, agro-ecological and hydrological information system to inform the analysis of climate-driven vulnerabilities and the cost-effective planning of climate-smart ecosystem rehabilitation and management measures; ii) strengthen institutional capacity for land use planning and decision-making by integrating climate risks into development plans and policies; iii) provide access to knowledge and training on adaptation using an ecosystem management approach; and iv) demonstrate climate-smart ecosystem rehabilitation and management measures in the Foothills, Southern Lowlands and the Lower Senqu River Basin. Project activities are scheduled to start shortly.

- Strengthening Capacity for Climate Change Adaptation through Support to Integrated Watershed Management Programme in Lesotho: This LDCF-financed project (GEF funding: $ 3.6 million; Project duration: 4 years) to be implemented by FAO was approved by GEF in February 2015. The project objectives are (i) to implement sustainable land and water management practices (SLM/W) and resource conservation measures in selected watersheds to reduce vulnerability and enhance adaptive capacity at community level and (ii) to strengthen diversified livelihood strategies focusing on crop, livestock and agro-forestry systems at community level in selected watersheds in three most vulnerable livelihood zones. Project activities are scheduled to start shortly.

- Preparation of Intended Nationally Determined Contribution (INDC) to the 2015 Agreement under the United Nations Framework Convention on Climate Change (UNFCCC): This $ 1.8 million GEF-funded project covering Antigua and Barbuda, Fiji, Lesotho, Mauritania, Mozambique, Myanmar, Seychelles, Turkmenistan and Zambia will be implemented by UNEP over a period of 10 months. The objective of the project is to prepare and submit intended nationally determined contributions to the 2015 United Nations Framework Convention on Climate Change (UNFCCC) Agreement and to have institutional arrangements in place that support the INDC process. This project was approved by GEF in March 2015 and project activities in Lesotho have not yet commenced.

During implementation of the proposed project, UNDP will ensure that the various project partners periodically meet to share information on progress in project activities and to avoid any duplication. These meetings may be organised in conjunction with meetings of the Project Board.

Other non-GEF-related Initiatives

- European Union (EU): The EU is a key donor in Lesotho's energy and climate change sectors through the on-going 10th European Development Fund (EDF) Global Climate Change Alliance (GCCA) programme which will come to an end in late 2016/early 2017. EU's assistance mainly targets budget support which, under the 10th EDF, amounts to almost € 71 million, focusing on Lesotho's efforts towards poverty reduction and sustainable development. Within this total funding, it allocated a specialised tranche directed towards "Support to the Climate Change Response Strategy" that specifically seeks to contribute to set up the "required policy

and institutional framework to reverse environmental degradation through the finalization of a National Climate Change Policy and Strategy and a National Sustainable Energy Policy and Strategy (building on the 2015 Energy Policy document)".

Under this specialised tranche, the EU prepared, in December 2014, a study entitled "Scoping of Potential Interventions in the Energy Sector under 11th EDF in Lesotho" that builds on EDF-10 and identifies its interventions under the next 11th EDF, viz. contribute to effective and sustainable governance of the energy sector, contribute to a more sustainable and cleaner energy sector and reduced reliance on biomass for the rural population. Discussions with the Government are presently on-going to finalise the exact nature of activities that will be targeted under EDF-11. In the interim, the EU has confirmed the following: "The EUR 28 million proposed as support to the energy sector in Lesotho still stands under 11th EDF. This support is going to be carried out in two Phases; Phase 1 (EUR 7 million) will put more emphasis on reinforcement of the policy environment and the institutional framework, complemented with selected pilot projects, (including the establishment of a Facility for Rural Electrification (FREA). Phase 2 will support larger scale energy investments, along with further support to the sector reform, where required. Based on this we believe most of the initiatives that we will be undertaking in the Energy Sector in Lesotho do complement the GEF project objectives".

- The Deepening Decentralization Programme (DDP): This project is jointly funded by the Government, EU, UNCDF and UNDP, with implementation over the period 2012 - 2016 and a budget of € 8.9 million. Its main objective is to promote decentralized services delivery for socio-economic growth through the development of transparent funding mechanisms and by improving accountability of local authorities. The project is implemented by the Ministry of Local Government in the ten districts and Maseru City Council, with the districts themselves determining their priorities, viz. road construction/repair, solid waste management, etc. Some district councils have included improved cook stoves among their priorities for cooking and hot water at health centres where maternal and child care services are provided.

- United Nations Economic Commission for Africa (UNECA): UNECA is currently implementing a project in Lesotho entitled "Enhancing and improving access to energy services through development of public-private renewable energy partnerships", with a budget of $ 91,000 over the period 2013 – 2015. The objective of the project is "to establish a demonstration project (the Multipurpose Clean Energy Centre in Lekokoaneng) that will advance a pro-poor public private partnership in clean and renewable energy in Lesotho. This demonstration project focuses on increasing access to clean energy technologies, information about energy choices, as well as training of local community on installing and servicing of technologies. The project will build capacity of the Government and other stakeholders on pro-poor PPPs (5Ps) for promoting energy services in rural areas through increased use of locally available renewable energy sources".
  The project has three main components, viz:
    - Develop a Business Plan for the establishment and implementation of an Integrated Energy Centre, as a demonstration project for Lesotho;
    - Identify a suitable cooperative to manage the demonstration project; and
    - Set up the Coordinating (Steering Committee) whose function is to guide the implementation of the demo project as well as provide on-going support in the lifespan of the activities

  Renovation of an existing building to house the Multipurpose Clean Energy Centre has recently been completed and some equipment (improved cook stoves, solar panels, solar lighting kits, LPG cylinders, etc.) have been procured. An official launch of the Centre is awaited.

- IAEA: In early 2014, IAEA started implementation of a two-year project entitled "Enhancing the Energy Databank and Building Human Capacity to Support the Energy Policy Framework". The project is linked to the

outputs of IAEA's regional programme: 1.3 Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy - 1.3.1 Energy Modelling, Data and Capacity Building.

The objective of the project, with a funding of $ 102,570 allocated to Lesotho, is to develop local capacity to operate and manage energy database and models, conduct energy surveys and policy development; and to acquire/adopt a suitable energy model. With this capacity in place, the DoE and BoS should be able to: i) undertake a comprehensive assessment of current situation and trends and to forecast the future energy demand and supply situation of the country; ii) identify sources of energy supply, to what extent various energy sources are used and factors behind these trends; iii) the project would have provided human capacity development, information technology and equipment to attain this objective; and iv) data will then be used to inform policy strategic decisions and to forecast future energy development patterns. The main support that BoS has received to date under this project consisted of capacity development activities on a Model for Analysis of Energy Demand (MAED) that were dispensed in April 2014.

- Scaling-up Renewable Energy in Low Income Countries Programme (SREP): SREP is a funding window that was established to scale up the deployment of renewable energy solutions in the world's poorest countries to increase energy access and economic opportunities. Channelled through five multilateral development banks (MDBs), SREP financing aims to pilot and demonstrate the economic, social, and environmental viability of low carbon development pathways, building off of national policies and existing energy initiatives. The African Development Bank is the SREP focal point for Africa and Lesotho has submitted a proposal for funding the following activities:

    - Establish an Independent Power Producer programme to generate electricity from renewable energy sources and pilot this to distribute generated electricity to communities in the rural areas (establishment of isolated mini-grids); and

    - Distribute pre-wired PV systems for lighting and cell phone charging and energy saving cook stoves for cooking.

3. PROJECT RESULTS FRAMEWORK

Project Title: Development of Cornerstone Public Policies and Institutional Capacities to accelerate Sustainable Energy for All (SE4All) Progress.					
UNDAF Outcome(s): Outcome 2: By 2017 Lesotho adopts environmental management practices that promote a low-carbon, climate-resilient economy and society, sustainably manages natural resources and reduces vulnerability to disasters.					
UNDP Strategic Plan Primary Outcome: Outcome 5: Countries are able to reduce the likelihood of conflict, and lower the risk of natural disasters, including from climate change.					
UNDP Strategic Plan Secondary Outcome: Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded.					
Expected CP Outcomes: Outcome 2: By 2017, Lesotho adopts environmental management practices that promote a low-carbon, climate-resilient economy and society, sustainably manages natural resources and reduces vulnerability to disasters.					
Applicable GEF Strategic Objective and Programme: To promote investment in renewable energy technologies (RETs).					
Applicable GEF Expected Outcomes: Total avoided GHG emissions from utilisation of RETs for rural energy services.					
Applicable GEF Outcome Indicators: Avoided GHG emissions from utilisation of RETs for rural energy services (tonnes CO_2) and \$/t CO_2.					
	Indicator	**Baseline**	**Targets End of Project**	**Sources of Verification**	**Risks and Assumptions**
Objective					
To catalyse investments in renewable energy-based mini-grids and Energy Centres to reduce GHG emissions and contribute to the achievement of Lesotho's Vision 2020 and SE4All goals.	Emission reductions (in tCO_2 over 20 yr timeline). Energy produced (MWh) by RETs. Number of jobs created. Number of beneficiary households in rural areas.	GHG emissions in the country have increased from 0.76 million tCO_2 in 1994 to 1.1 million tCO_2 in 2000 and expected to increase to 5.2 million tCO_2 by 2030. The present contribution of RETs in the provision of off-grid rural energy services is negligible. No investment taking place in the provision	RET-based electricity generation of 211 MWh/year. Reduction of 213,680 tonnes of CO_2 (project and immediate post-project) over the 20-year lifetime of the RET systems. Estimated cumulative indirect GHG emission reduction of 641,040 tonnes of CO_2 by 2025 applying a replication factor of 3. Total of 1,125 jobs	Project's annual reports, GHG monitoring and verification reports. Project mid-term review and terminal evaluation reports.	Continued commitment of project partners, including Government agencies and investors/developers.

		of rural energy services through mini-grids electricity generation.	created. 3,000 beneficiary households in rural areas.		
Component 1: Development of cornerstone SE4All Policies and Strategies to facilitate investment in renewable energy-based mini-grids.					
Outcome 1: SE4All cornerstone policies and strategies facilitating (increased) investment in RET deployment, particularly isolated mini-grids.	Existence of policies and strategies.	Not available at the present time.	To be completed and approved by Government within 12 months of project initiation.	Project documentation.	Cooperation and interest of Government entities.
	Existence of Country Action Agenda.	Not available at the present time.	To be completed and approved by Government within 12 months of project initiation.	Project documentation.	Cooperation and interest of Government entities.
	Existence of Investment Prospectus.	None available at the present time.	To be operationalised within 12 months of project initiation.	Project documentation.	Cooperation of Government entities and private sector.
	Existence of strategies and investment plans. Investment of $ 10 million in RETs in rural areas over 5 years after project completion.	None available at the present time. None available at the present time.	To be completed within 18 months of project start. To be completed by project end.	Project reports. Project reports.	Continued interest of the private sector.
Component 2: Baseline energy data collection and monitoring for SE4All.					
Outcome 2: Improved capacity of energy stakeholders and government officials for decentralized clean	Capacity of stakeholders developed.	Not available at the present time.	To be completed within 12 months of project initiation.	Project documentation.	Cooperation of all stakeholders.

energy planning and decision-making on the basis of quality energy data.	Completion of national energy survey.	None available at the present time.	To be completed within 9 months of project initiation and results validated by stakeholders by the end of Year 1.	Published documents.	Commitment of the various Government institutions and NGOs.
	Existence of energy database and information system.	Not available at the present time.	To be completed within 9 months of project initiation.	Project reports.	Commitment of the various Government institutions and project developers.
	Energy modelling software being utilised.	Not available at the present time.	To be completed within 12 months of project initiation and approved by the Government by the end of year 1.	Evidence of fully operational software. Project reports.	Continued commitment of the various Government institutions.
	Harmonised data available.	No harmonisation taking place at the present time.	To be completed within 18 months of project start.	Project documentation.	Continued commitment of the various Government institutions.
Component 3: Village-based energisation schemes.					
Outcome 3: Successful establishment of a village-based energy service delivery model for replication nationally.	Availability of business model.	No such model available now.	To be completed within 18 months of project start.	Project reports.	Government entities and private sector willing to cooperate.
	Pre-feasibility studies completed.	No such pre-feasibility studies undertaken at the present time.	Completed within 12 months of project start.	Project reports.	Continued interest of Government and private sector.
	Mini-grids and Energy Centres operational.	None at the present time.	All 60 village-based RET mini-grids and 20 Energy Centres (project and immediate post-project) constructed and operational.	Reports confirming that all mini-grids and Energy Centres are operational.	Continued interest of private investors.

	Existence of capacity development material.	None at the present time.	Capacity development completed within 24 months of project start.	Capacity development material available. Project report that training was successfully delivered.	Continued interest of Government entities.
	Evidence of private sector investment in in village-based energisation through mini-grids/Energy Centres.	None at the present time.	$ 5 million invested by project end.	Reports on completed village energisation projects.	Continued interest of private sector investors.
Component 4: Outreach programme and dissemination of results.					
Outcome 4: Outreach programme and dissemination of project experience/best practices/lessons learned for replication nationally and throughout the region.	Existence of outreach programme.	Lack of sufficient information to pursue programme.	Increased awareness among stakeholders in place to promote and develop RET-based mini-grids for village energy services.	Project final report and web site.	Growth of programme will be sustained.
	Availability of national plan.	No such plan available.	Completed within 24 months of project initiation.	Project documentation.	Expected expansion of programme. Continued interest of investors.
	Existence of capacity development material.	No capacity development programme.	10 staff from Government/other Institutions successfully trained by the end of project.	Project reports.	Designation of staff by relevant Government Departments/other Institutions.
	Existence of published material.	Lack of information on best practices and lessons learned.	Completed within 3 months of project end.	Project documentation and website.	Continued interest of stakeholders.

	Availability of workshops proceedings.	No such workshops held in the country.	Completed within 3 months of project completion.	Reports of workshops.	Interest of local (and international) participants.

TOTAL PROJECT BUDGET AND WORK PLAN

Award ID:	00082649	**Project ID(s):**	00091460
Award Title:	Sustainable Energy for All		
Business Unit:	LSO10		
Project Title:	Development of Cornerstone Public Policies and Institutional Capacities to accelerate Sustainable Energy for All (SE4All) Progress.		
PIMS no.	5367		
Implementing Partner (Executing Entity)	Ministry of Energy and Meteorology (MEM).		

GEF Outcome/ Atlas Activity	Resp. Party / Impl. Agent	Fund ID	Donor Name	ATLAS Budget Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	TOTAL Amount (USD)	Notes
1 SE4All cornerstone policies and strategies facilitating (increased) investment in RET deployment, particularly isolated mini-grids.	NIM	62000	GEF	71200	International Consultants	50,000	50,000	40,000	35,000	30,000	205,000	a
		62000	GEF	71300	Local Consultants	40,000	30,000	20,000	15,000	15,000	120,000	b
		62000	GEF	71600	Travel	3,000	3,000	3,000	3,000	3,000	15,000	c
		62000	GEF	72200	Equipment and Furniture	5,000	5,000	5,000	5,000	5,000	25,000	d
		62000	GEF	74200	Audio Visual & Print Prod Costs	5,000	4,000	2,000	2,000		13,000	e
		62000	GEF	74500	Miscellaneous Expenses	3,000	3,000	3,000	3,000	3,000	15,000	f
		62000	GEF	75700	Training, Workshops and Conferences	3,000	0	0	0	4,000	7,000	g
					Total Outcome 1	**109,000**	**95,000**	**73,000**	**63,000**	**60,000**	**400,000**	
2. Improved capacity of	NIM	62000	GEF	71200	International Consultants	30,000	30,000	20,000	20,000	20,000	120,000	h

GEF Outcome/ Atlas Activity	Resp. Party / Impl. Agent	Fund ID	Donor Name	ATLAS Budget Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	TOTAL Amount (USD)	Notes
energy stakeholders and government officials for decentralized clean energy planning and decision-making on the basis of quality energy data.		62000	GEF	71300	Local Consultants	30,000	30,000	20,000	22,500	20,000	122,500	i
		62000	GEF	71600	Travel	5,000	5,000	5,000	5,000	5,000	25,000	j
		62000	GEF	72200	Equipment and Furniture	10,000	10,000	0	0	0	20,000	k
		62000	GEF	74500	Miscellaneous	2,500	2,500	2,500	2,500	2,500	12,500	l
					Total Outcome 2	**77,500**	**77,500**	**47,500**	**50,000**	**47,500**	**300,000**	
3. Successful establishment of a village-based energy service delivery model for replication nationally.	NIM	62000	GEF	71200	International Consultants	150,000	150,000	150,000	150,000	100,000	700,000	m
		62000	GEF	71300	Local Consultants	150,000	125,000	100,000	100,000	100,000	575,000	n
		62000	GEF	71600	Travel	10,000	10,000	10,000	10,000	10,000	50,000	o
		62000	GEF	72100	Contractual Services – Companies	0	300,000	300,000	200,000	200,000	1,000,000	p
		62000	GEF	72200	Equipment and Furniture	50,000	50,000	30,000	20,000	0	150,000	q
		62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	5,000	25,000	r
					Total Outcome 3 (GEF only)	**365,000**	**640,000**	**595,000**	**485,000**	**415,000**	**2,500,000**	
		04000	UNDP	72100	Contractual Services – Companies	0	50,000	50,000	50,000	50,000	200,000	s
					Total Outcome 3 (GEF + UNDP)	**365,000**	**690,000**	**645,000**	**535,000**	**465,000**	**2,700,000**	
4. Outreach programme and dissemination of project experience/best practices/lesso	NIM	62000	GEF	71200	International Consultants	15,000	15,000	15,000	12,000	5,000	62,000	t
		62000	GEF	71300	Local Consultants	10,000	10,000	10,000	10,000	5,000	45,000	u
		62000	GEF	71600	Travel	3,000	3,000	3,000	3,000	3,000	15,000	v
		62000	GEF	74200	Publications	2,000	2,000	2,000	2,000	5,000	13,000	w

GEF Outcome/ Atlas Activity	Resp. Party / Impl. Agent	Fund ID	Donor Name	ATLAS Budget Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	TOTAL Amount (USD)	Notes
ns learned for replication nationally and throughout the region.		62000	GEF	74500	Miscellaneous	1,000	1,000	1,000	1,000	1,000	5,000	x
					Total Outcome 4	**31,000**	**31,000**	**31,000**	**28,000**	**19,000**	**140,000**	
Project Management	NIM	62000	GEF	71400	Contractual Services – Individual	26,250	26,250	26,250	26,250	28,194	133,194	y
		62000	GEF	74598	Direct Project Cost	5,160	5,160	5,160	5,160	6,166	26,806	z
					GEF Total Project Management	**31,410**	**31,410**	**31,410**	**31,410**	**31,410**	**160,000**	
		04000	UNDP	71400	Contractual Services – Individual	40,000	40,000	40,000	40,000	40,000	200,000	y
					Total Project Management	**71,410**	**71,410**	**71,410**	**71,410**	**74,360**	**360,000**	
	SUB-TOTAL GEF					**613,910**	**874,910**	**777,910**	**657,410**	**575,860**	**3,500,000**	
	SUB-TOTAL UNDP TRAC					**40,000**	**90,000**	**90,000**	**90,000**	**90,000**	**400,000**	
	GRAND TOTAL					**653,910**	**964,910**	**867,910**	**747,410**	**665,860**	**3,900,000**	

	Budget Notes
a	Partial costs of NR CTA, Financial Engineering Expert and Int. Consultants for SE4All cornerstone policies and strategies.
b	Local consultancy support to NR CTA and Int. Consultants for SE4All cornerstone policies and strategies.
c	Domestic travel to project sites.
d	Project equipment and software.
e	Publication of policy and strategy documents, training material, etc.
f	Miscellaneous expenses.
g	Inception and end-of-project workshops.
h	Partial costs of NR CTA and Int. Consultants for data collection and processing.
i	Local consultancy support to NR CTA and Int. Consultants for data collection and processing.
j	Domestic travel to project sites.
k	Equipment and software for data input and processing.
l	Miscellaneous expenses.
m	Partial costs of NR CTA and Int. Consultants for village energisation.
n	Local consultants to support NR CTA and Int. Consultants for village energisation.

	Budget Notes
o	Domestic travel to project sites.
p	Financial Support scheme.
q	Equipment and software for designing FSS and undertaking/reviewing pre-feasibility/feasibility studies.
r	Miscellaneous expenses.
s	Financial Support scheme.
t	Partial costs of NR CTA and Int. Consultants for outreach programme.
u	Local consultants to support NR CTA and Int. Consultants for outreach programme.
v	Domestic travel to project sites.
w	Publications of results obtained, lessons learned, etc.
x	Miscellaneous expenses.
y	Project personnel costs.
z	Direct project costs.

Summary of Funds

	Amount ($) Year 1	Amount ($) Year 2	Amount ($) Year 3	Amount ($) Year 4	Amount ($) Year 5	Total ($)
GEF	613,910	875,910	778,910	655,410	575,860	3,500,000
UNDP	40,000	90,000	90,000	90,000	90,000	400,000
National Government	1,000,000	2,500,000	2,000,000	1,700,000	1,267,837	8,467,837
European Union	500,000	1,000,000	1,500,000	2,000,000	2,900,000	7,900,000
Private Sector (Bethel)	300,000	500,000	500,000	400,000	300,000	2,000,000
Private Sector (Lesotho Solar Energy Society)	50,000	100,000	125,000	150,000	75,000	500,000
TOTAL	**2,503,910**	**5,065,910**	**4,993,910**	**4,995,410**	**5,208,697**	**22,767,837**

4. MANAGEMENT ARRANGEMENTS

The Ministry of Energy and Meteorology (MEM) is the central body responsible for formulating and implementing the Government's policy in the field of energy. It also entrusted with the responsibility of putting in place policy, plans and programmes that govern rural electrification through either grid extension or isolated mini-grids based on diesel and/or diesel/renewable energy hybrid systems. To achieve this, it has the support of the agencies that it supervises, viz. Department of Energy, Lesotho Electricity and Water Authority, Lesotho Electricity Company, Rural electrification Unit, etc.

The project will be implemented through the NIM execution modality by the Department of Energy (DoE) under the supervision of the Ministry of Energy and Meteorology (MEM) as the national implementing partner (NIP). DoE/MEM will provide office space to the project team as part of its contribution. It will also assign a senior officer as the National Project Director (NPD) to: (i) coordinate the project activities with those of other Government entities like the Bureau of Statistics (BoS) of the Ministry of Development Planning, Lesotho Electricity and Water Authority (LEWA), Department of Standards and Quality Assurance (DSQA) of the Ministry of Trade and Industry, National University of Lesotho, etc. (ii) certify the expenditures in line with approved budgets and work-plans; (iii) facilitate, monitor and report on the procurement of inputs and delivery of outputs; (iv) approve the Terms of Reference for consultants and tender documents for sub-contracted inputs; and (v) report to UNDP on project delivery and impact.

The National Project Director will be assisted by a Programme Management Unit headed by a Project Manager (PM) to be recruited through a competitive process. The PM will be responsible for overall project coordination and implementation, consolidation of work plans and project papers, preparation of quarterly progress reports, reporting to the project supervisory bodies, and supervising the work of the project experts and other project staff. The PM will also closely coordinate project activities with relevant Government and other institutions and hold regular consultations with project stakeholders. In addition, a Project Assistant (PA) will be recruited to support the PM on administrative and financial issues.

The Project Manager will be supported by an international part-time Chief Technical Adviser (CTA), short-term international and national experts/consultants who will support implementation of specific technical assistance components of the project. Contacts with experts and institutions in other countries that already have experience in implementing renewable energy-based rural electrification projects, and related policy and financial support measures will also to be established.

A Project Board, chaired by the Ministry of Energy and Meteorology will be established to provide strategic direction and management guidance to project implementation. It will consist of representatives of relevant Ministries and Government Departments/Directorates (Ministry of Development Planning, Bureau of Statistics (BoS), Lesotho Electricity and Water Authority (LEWA), Department of Standards and Quality Assurance (DSQA) of the Ministry of Trade and Industry, National University of Lesotho) participating in the project, the UNDP Country Office, the National Project Director as well as representatives of the NGO community and women's groups. Representatives of the private sector may be invited to participate as observers. Representatives of the private sector may be invited to participate as observers.

Finally, the UNDP CO will provide specific support services for proper project implementation, as required, through its Administrative, Programme and Finance Units and through support from the Addis Ababa Regional Service Centre. Specific support services will include support for annual PIR review (project implementation review), mid-term review and terminal evaluation. An organigramme representing the implementation arrangement is presented in Fig. 9 below.

Project implementation will be governed by the provisions of the present Project Document and Programme and Operations Policy and Procedures (POPP). UNDP Lesotho will maintain oversight and management of the overall project budget, utilizing a direct payment modality. UNDP Lesotho's support services will be charged in accordance with the Agreement between the NIP and UNDP for the Provision of Services by UNDP. Governance of the Project

will be supported through annual work planning as well as reporting and monitoring the delivery of results and impact on the basis of the results framework. The annual work plans as well as progress reporting will be the responsibility of the project management and will be approved by the NPD in close consultation with UNDP.

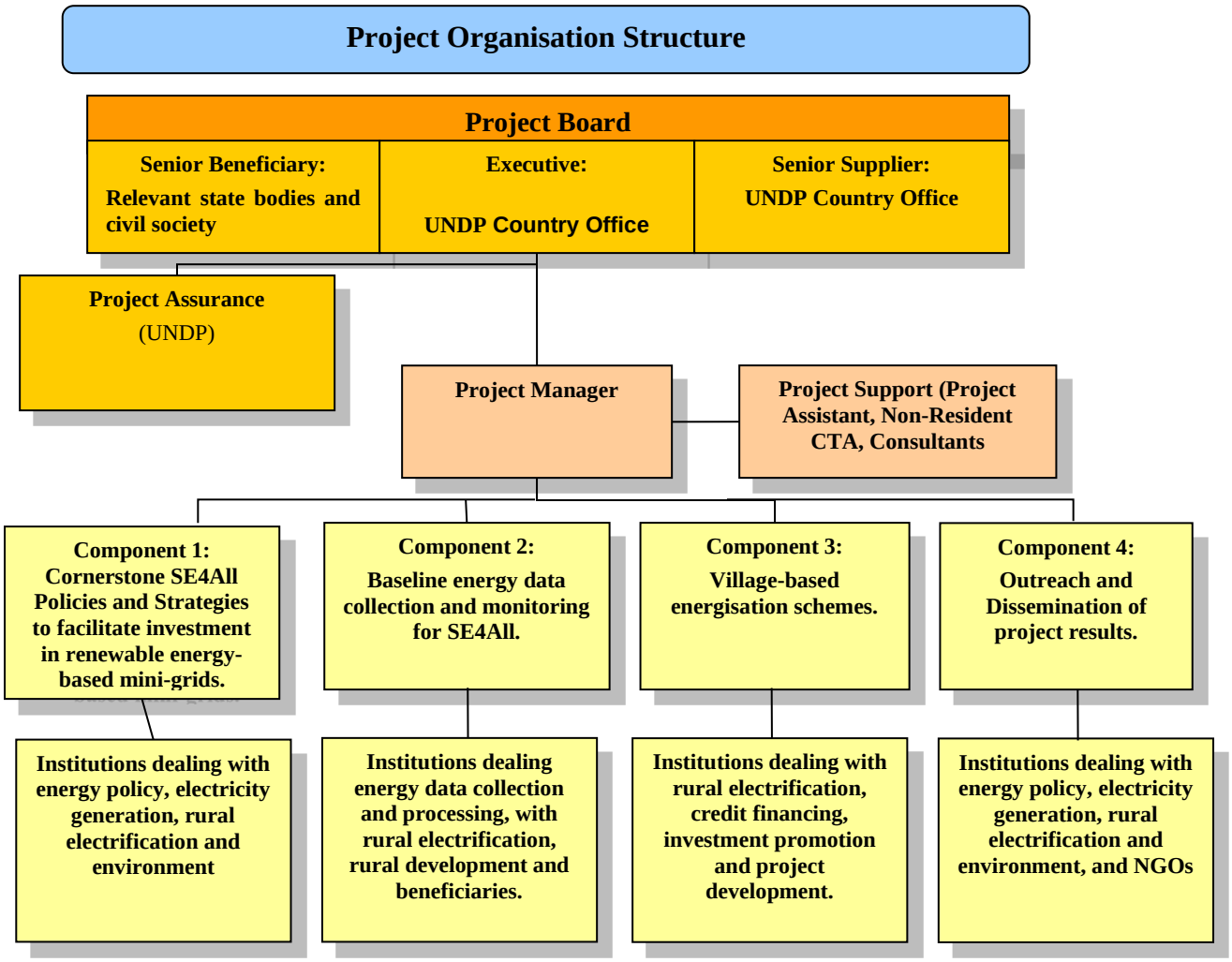


Fig 9: Project Organisation Structure

5. MONITORING AND EVALUATION

UNDP Lesotho will be responsible for monitoring and evaluation (M&E), including organising project evaluations, approving annual implementation work plans and budget revisions, monitoring progress, identifying problems and suggesting remediating actions, facilitating timely delivery of project outputs and supporting the coordination and networking with other related initiatives and institutions in the country and in the region.

During implementation, proper care will be exercised to have adequate communication and co-ordination mechanisms in place to ensure that areas of common interest can be addressed in a cost-efficient way.

The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

Project start:
A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RSC staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
b) Based on the project results framework and the relevant GEF Tracking Tool, if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

  During annual review of activities, the project will evaluate the cost-effectiveness of mini-grids compared to solar home systems (SHS) and solar products and implement remedial action, where appropriate. The project will also ensure that Energy Centres provide rural inhabitants with options that support cost-effectiveness in the provision of energy services.

  The APR/PIR includes, but is not limited to, reporting on the following:
  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)

- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP RSC will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the UNDP CO and UNDP RSC and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent mid-term review (MTR) at the mid-point of project implementation around June/July 2018. The MTR will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this mid-term review will be prepared by the UNDP CO based on guidance from the Regional Service Centre and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Centre (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term review cycle.

End of Project:

An independent terminal evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The terminal evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The terminal evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Service Centre and UNDP-GEF.

The terminal evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Centre (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the terminal evaluation.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M&E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP GEF	Indicative cost: 12,000	Within first two months of project start up.
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on output and implementation.	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports.	▪ Project manager and team	None	Quarterly
Mid-term Review	▪ Project manager and team ▪ UNDP CO ▪ UNDP RSC ▪ External Consultants (i.e. evaluation team)	Indicative cost: 35,000	At the mid-point of project implementation.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Terminal Evaluation	▪ Project manager and team. ▪ UNDP CO ▪ UNDP RSC ▪ External Consultants (i.e. evaluation team).	Indicative cost: 40,000	At least three months before the end of project implementation.
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000 (Total: 15,000)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RSC (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget.	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses.		US$ 102,000	

6. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Audit Clause: Audit will be conducted in accordance with UNDP Financial Rules and Regulations, and applicable audit policies for UNDP projects.

7. ANNEXES

Annex 1 – Offline risk log
Annex 2 – Terms of Reference
Annex 3 – Letters of Co-financing (Provided in separate file)
Annex 4 – Tracking Tool (Provided in separate file)
Annex 5 – GHG calculations
Annex 6 – Social and Environmental Screening Procedure
Annex 7 – Agreement on Direct Project Costs

ANNEX 1: OFFLINE RISK LOG

#	Description	Date identified	Type	Impact & Probability	Countermeasures/Mgt. response	Owner	Submitted, updated by	Last Update	Status
1.	Policy: Framework to encourage the private sector to invest in renewable energy-based rural energy services.	During PIF formulation and PPG implementation.	Policy	P=4 I=4	There exists the possibility that the Government may not act soon enough on a policy framework that will encourage the private sector to invest in renewable energy-based rural energy services; as examples, the 2003 Energy Policy and the 2013 Renewable Energy Policy have been in draft form for quite some time. If this were to happen, project implementation will get hampered. However, the Government is strongly motivated to provide access to modernised energy services to the large rural population that utilises traditional forms of energy, to improve their quality of life and for income-generating activities, and is driven by its plans to meet both the objectives of the Lesotho Vision 2020 and the S4All Initiative. Towards this end, it only very recently approved the new 2015 Energy Policy, thus sending the right signal to stakeholders. With regard to the 2013 Renewable Energy Policy, it is still in draft form. However, the donor community will work with the newly-installed Government to have the right policy in place and preliminary indications are that this may materialise sooner, rather than later. Moreover, project interventions under Component 1 will assist in mitigating this risk.	CO to monitor.			
2.	Institutional: Dependence on SAPP imports could	During PIF formulation and	Policy	P = 3 I = 3	The risk of continued dependence on electricity import from the South African	CO to monitor.			

#	Description	Date identified	Type	Impact & Probability	Countermeasures/Mgt. response	Owner	Submitted, updated by	Last Update	Status
	increase or become more attractive relative to development of the country's indigenous RETs.	PPG implementation.			Power Pool, mainly based on coal generation, will remain in border areas, to the detriment of renewable energy based decentralised options. However, this does not pose a risk deep inside the country, as stringing long electricity lines does not make economic sense due to the small loads and difficult terrain. Moreover, this risk will be mitigated by the fact that, as per existing projections (ref. Sothern African Power Pool: Planning and Prospects for Renewable Energy, IRENA 2013) which indicate that "the share of renewable technologies in electricity production in the South African Power Pool region could increase from the current level of 10% to as high as 46% in 2030".				
3.	Financial: SE4All funding resources may not materialize, thus making the CAA and IP of little use.	During PIF formulation and PPG implementation.	Technology	P = 3 I = 3	If this were to happen, it will provide a set-back in the development of RETs in the country, as the project does not have leverage over the high-level global commitments and funding mechanisms established as part of SE4All. However, indications from the country action process developed by the SE4All Secretariat are that those countries that expeditiously complete their CAA and IP documents will be prioritized as regards access to dedicated SE4All funds when and if they materialize. Project interventions under Component 4 will assist in mitigating this risk by targeting both domestic and international investors.	CO to monitor.			
4.	Poor investment climate.	During PIF formulation and PPG implementation.	Business	P = 3 I = 3	The fact that Lesotho ranks in the 128th place in "Ease of doing Business", as per the WB/IFC "Doing Business 2015" publication and 115th in enforcing	CO to monitor.			

#	Description	Date identified	Type	Impact & Probability	Countermeasures/Mgt. response	Owner	Submitted, updated by	Last Update	Status
					contracts might act as a deterrent for investors in RETs, although these have not tempered investors' willingness to invest in the garment industry to benefit from business opportunities available under AGOA. With this in mind, the project will put in place a Financial Support Scheme that will be directed at minimising the financial risks that lenders and investors may face in doing business targeting RETs for the rural areas.				
5.	Technology: Renewable energy equipment of poor quality introduced in the country.	During PIF formulation and PPG implementation.	Technology	P = 3 I = 3	Poor quality of equipment and shoddy installation have been shown to have plagued some SHS in Lesotho. Hence, the Government will put in place, through the Department of Standards and Quality Assurance (DSQA), strict controls on the standards of renewable energy equipment that can be imported and installed in the country. In addition, the Government will ensure that all installations and maintenance should be undertaken only by licensed and certified technicians as per established electricity codes.	CO to monitor.			
6.	Environmental/ Climate Change.	During PIF formulation and PPG implementation.	Environmental	P = 3 I = 3	There are multiple environmental risks, as outlined in Lesotho's Second National Communication to UNFCCC (e.g. reduced rainfall that can affect water flows, land and watershed degradation due to erosion and population pressures) that can affect energy planning and infrastructure investments. These are being and will continue to be addressed through capacity development of Government staff on the key aspects to address national challenges associated with weather, climate and climate change.	CO to monitor.			

ANNEX 2: TERMS OF REFERENCE

1. Project Manager

I. Position Information	
Post title: Office: Organisation: Duration of Employment: Duty station:	Project Manager (Full-time) Project Management Unit (PMU) Ministry of Energy and Meteorology (MEM) One year with possibility of extension Maseru, Lesotho
II. Duties	
• Lead, manage and coordinate the day-to-day activities of the PMU to be established within MEWF, including administration, accounting, technical expertise, and actual project implementation and reporting; • Lead the development of project design including preparation of consultants' and sub-contractors' terms of reference, identification and selection of national and international sub-contractors/consultants, cost estimation, time scheduling, contracting, and reporting on project activities and budget; • Monitor and follow-up on the status of delivery by consultants, sub-contractors, etc. • Coordinate activities of consultants including contract management, direction and supervision of field operations, logistical support, review of technical outputs/reports, measurement/assessment of project achievements and cost control; • Assist in the design, supervision and outreach activities of the project; • Provide technical support to policy discussions on renewable energy technologies for rural electrification in the country; • Act as a liaison/facilitator among the various stakeholders, including the private sector, international and national partners; • Assume responsibility for the quality and timing of project outputs; • Establish and maintain relationships and act as the key focal point with UNDP CO to ensure that all programming, financial and administrative matters related to the project are transparently, expediently and effectively managed, in line with established UNDP Rules and Regulations. • Undertake other management duties that contribute to the effective implementation of the project.	
III. Qualifications and Experience	
Education:	• Master's degree or equivalent in engineering, economics, international development, social sciences, public administration or other relevant field.
Experience:	• Minimum of 5 years of experience in management, preferably in the energy field. • Proven ability to draft, edit and produce written proposals and results-focussed reports. • Proven experience working with Government, civil society, international organizations or donors in combination with the knowledge of economic and financial analysis, institutional, regulatory and policy frameworks. • Good knowledge of and experience GEF Climate Change issues, operational modalities and familiarity with UNDP-GEF procedures would be an advantage.

	• Familiarity with UNDP rules, regulations and administrative procedures would be an advantage. • Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in African countries; • Experience in the use of computers and office software packages (MS Word, Excel, etc.)
Language Requirements:	• Excellent English, both written and oral.

2. Project Assistant

I. Position Information	
Post title:	Project Assistant (Full-time)
Office:	Project Management Unit (PMU)
Organisation:	Ministry of Energy and Meteorology (MEM)
Duration of Employment:	One year with possibility of extension
Duty station:	Maseru, Lesotho

II. Functions

Under the overall supervision of the Project Manager, the Project Assistant will:

- Support the activities of international/national experts, potential investors and sub-contractors;
- Provide administrative support re. typing, filing, arranging visas for international experts/sub-contractors, maintaining project's financial records, etc.;
- Administer project accounting as per UNDP procedures;
- Assist the Project Manager in organising workshops, meetings of the Project Board and other events.
- Assist in procurement of goods and services;
- Draft letters of invitation and agendas for meetings of Project Board/workshops;
- Prepare background information, briefing materials, reports, etc., as required;
- Draft minutes of meetings, monitor/follow-up on actions required.

III. Qualifications and Experience

Education:

- Higher education in economics, management, accounting, finance or other related field.
- Specialized training in finance is desirable

Experience:

- 3 years of relevant administrative, accounting and financial experience at national and/or international level.
- Experience in the usage of computers and office software packages (MS Word, Excel, etc.).
- Previous experience of working for nationally executed programme (s) funded by bilateral/multilateral organisations.
- Practical experience in procurement will be an asset.

Language Requirements:

- Excellent English, both written and oral.

3. Chief Technical Adviser (Non-resident)

Post title:	Chief Technical Adviser (Non-Resident)
Office:	Project Management Unit (PMU)
Organisation:	Ministry of Energy and Meteorology (MEM)
Duration of Employment:	15 weeks (over a 5-year period) (15 days per year including 2 missions of 5 days each. Contracts for 12 months, renewable based upon performance)
Duty station:	Home Office + Maseru, Lesotho

II. Duties

Under the overall supervision of the Project Manager, the non-resident Chief Technical Adviser will:

- Work closely with the PM in coordinating and facilitating inputs of government agencies, partner organizations, scientific and research institutions, subcontractors, and national and international experts in a timely and effective manner;
- Provide guidance and assistance to the PM and project staff to ensure that the project activities conform to the approved project document;
- Assist the PM during the initial 2 months of the project, in the preparation of an "inception report" which will elaborate on the project Logical Framework Matrix and planned project activities, the 1st year Annual Work Plan and Budget, ToRs for key project staff, and an M&E plan;
- Assist the PMU in development of relevant ToRs and recruitment/mobilization of qualified national and international experts and organizations as needed to provide specific consultancy and engineering services;
- Formulate procedures for the Financial Support Scheme (FSS) and support its implementation;
- In close cooperation with the PMU and UNDP's Focal Point on Energy and Environment, and in consultation with the project partner organizations and stakeholders, prepare Annual Project Work Plans to be agreed upon by the Project Board (PB);
- Provide "on-the-job" technical guidance and mentoring to the PMU in order to strengthen their capacity to effectively implement the technical aspects of the project;
- Support the PM in reporting to the PB on the progress of project implementation and achievement of project results in accordance with the project's logical framework matrix;
- Support the PMU in project-related meetings, as required;
- Review reports of national and international consultants, project budget revisions, and administrative arrangements as required by UNDP/GEF procedures;
- Assist the PM in the development of a concrete Monitoring and Evaluation Plan at the outset of the project (within inception report);
- Support the PM in preparing project progress reports, information releases, as well as monitoring and review reports in accordance with UNDP/GEF monitoring and evaluation rules and procedures;
- Support the PM in the preparation and implementation of mid-term review and terminal Independent Evaluation Missions (TOR's, identification and recruitment of appropriate candidates, organization of missions, joint field missions and discussion with evaluators, etc.);
- Support UNDP CO staff on their annual monitoring visits to project sites.

III. Qualifications and Experience

Education:	• Postgraduate degree in energy/renewable energy development.

Experience:	• Minimum ten years of experience in implementing renewable energy projects in combination with knowledge of economic and financial analysis, institutional, regulatory and policy frameworks; • Good knowledge of and experience GEF Climate Change issues, operational modalities and familiarity with UNDP-GEF procedures would be an advantage; • Familiarity with UNDP rules, regulations and administrative procedures would be an advantage; • Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in African Developing States; • Computer proficiency, especially related to professional office software packages; • Excellent drafting and communication skills.
Language Requirements:	• Excellent English, both oral and written.

4. Expert on Financial Engineering

Post title: Office: Organisation: Duration of Employment: Duty station:	Financial Engineering Expert Project Management Unit (PMU) Ministry of Energy and Meteorology (MEM) 30 days, including a one-week mission to Lesotho Home Office + Maseru, Lesotho

II. Duties

Under the overall supervision of the Project Manager, the Financial Engineering Expert will:

- Review the project document and Request for CEO Endorsement in detail in order to fully understand the overall project design and the rationale and expected role of the FSS.
- Meet with LEWA, the Department of Energy, potential project developers and other key stakeholders during a brief in-country mission to understand how similar funds in Lesotho are currently managed, in particular the Universal Access Fund, and to discuss the proposed design of the FSS.
- Identify potential donors for the additional capitalisation of the FSS. One of the project's targets is that $5 million has been invested in the FSS by project end.
- Based on the desk review and stakeholder consultations, and taking into account the experience with similar financial mechanisms in other GEF projects, design the FSS in line with the three elements outlined above, namely:
    - A performance-based incentive for project developers based upon the actual energy produced;
    - Support for the preparation of feasibility studies/business plans and partial investment for isolated RE-based mini-grids;
    - Support for the establishment of 10 Energy Centres, each serving about 5 villages.
    - Draft a Memorandum of Understanding between UNDP and LEWA defining how the project will work with LEWA.

III. Qualifications and Experience

Education:	• A post-graduate university degree in climate finance as it relates to climate change, environmental management and/or business administration, or equivalent work experience.
Experience:	• At least 5 years of professional experience in designing financial mechanisms for GEF climate change mitigation projects. • Strong knowledge on renewable energy, including renewable energy-based mini-grids. • Experience with banking and financial practices supporting renewable energy-based mini-grids, especially in African Developing States, would be an asset. • Familiarity with UNDP rules, regulations and administrative procedures would be an advantage. • Computer proficiency, especially related to professional office software packages. • Excellent drafting and communication skills.
Language Requirements:	• Excellent English, both oral and written.

ANNEX 5: GHG Calculations

The project is expected to be approved in time to commence activities in late 2015/early 2016. Under this assumption, activities addressing the policy and regulatory issues should be completed within the first year of project activities (Year 1 of project), including regulations and procedures for the private sector to participate in the electricity sub-sector, model contracts for rural mini-grids and tariffs to be charged to consumers. Under this scenario, it is also assumed that 2 renewable energy mini-grids will be established during Year 2, 4 in Year 3 and the remaining 4 during Year 4. With regard to the Energy Centres, it is assumed that 3 of them will be established during Year 2 of the project, another 3 during Year 3 and the remaining 4 established during Year 4. Hence, by the start of Year 5 of the project, all 10 mini-grids and 10 Energy Centres should be operational. In addition, the final year (Year 5) of the project will be devoted to consolidating the gains and momentum generated during the prior years to expand the rural mini-grid/EC programme. An installation/establishment schedule for the mini-grids and Energy Centres is provided in Table 6 below.

District	Village	Year 2	Year 3	Year 4
Mohale's Hoek	Ketane, 5 kW MHMG.	✓		
	Ribaneng, 15 kW PVMG.		✓	
	Koebunyane, EC		•	
	Phamong, EC			•
Mokotlong	Matsoaing, 12 kW PVMG.		✓	
	Tlhyanaku, 5 kW MHMG.			✓
	Mahaoleng, EC	•		
	Mateanong, EC		•	
Qacha's Neck	Sehlabathebe, 5 kW MHMG.	✓		

	Lebakeng, 5 kW MHMG.			✓
	Matebeng, EC	•		
	Melikane, EC			•
Quthing	Tosing, 5 kW MHMG.		✓	
	Sebapala, 5 kW MHMG.			✓
	Kubung, EC		•	
	Qhoali, EC			•
Thaba-Tseka	Sehong-hong, 5 kW MHMG.		✓	
	Mashai, 14 kW PVMG.			✓
	Linakaneng, EC	•		
	Ha Mokoto, EC			•

EC: Energy Centre MHMG: Micro-hydro mini-grid PVMG: PV mini-grid

Table 6: Installation/Establishment Schedule at-a-glance.

Theoretically, the micro-hydro power stations have the capacity to operate 24 hrs/day, under the assumption that electricity will be required round the clock. However, for purposes of computing GHG emissions, it will be assumed that the micro-hydro power stations will only operate during 12 hrs/day and have 85% availability (downtime of 15% related to stoppages for maintenance/repair); PV systems, as indicated earlier, will generate 6 kWh/kW/day and are also assumed to have 85% availability. As per the above schedule, electricity generation per village over the project duration from Year 2 through Year 4 (no equipment would have been installed during Year 1) will be as follows:

District	Village	Year 2 (kWh)	Year 3 (KWh)	Year 4 (kWh)	Subsequent Years (kWh/yr)
Mohale's Hoek	Ketane, 5 kW MHMG.	9,308	18,615	18,615	18,615
	Ribaneng, 15 kW PVMG.	-	13,961	27,923	27,923
Mokotlong	Matsoaing, 12 kW PVMG.	-	11,169	26,280	26,280
	Tlhyanaku, 5 kW MHMG.	-	-	9,308	18,615
Qacha's Neck	Sehlabathebe, 5 kW MHMG.	9,308	18,615	18,615	18,615
	Lebakeng, 5 kW MHMG.	-	-	9,308	18,615
Quthing	Tosing, 5 kW MHMG.	-	9,308	18,615	18,615
	Sebapala, 5 kW MHMG.	-	-	9,308	18,615

Thaba-Tseka	Sehong-hong, 5 kW MHMG.	-	9,308	18,615	18,615
	Mashai, 14 kW PVMG.	-	-	13,031	26,061
Total		18,616	80,976	169,618	210,509

Table 7: Electricity generation over project duration

As per Table 7 above, by project completion, some 269 MWh (sum of Years 2, 3 and 4) would have been generated and an annual generation of 211 MWh will be sustained over an expected 20-year projected life of the equipment; this scenario does not make any allocation for additional mini-grids that could be installed during the project timeframe, utilising the momentum generated by the project. All this renewable energy generation, if not implemented, would have otherwise been accomplished through diesel power generation burning imported fuel, with an emission factor of 0.875 tCO_2/MWh (Ref. Second National Communication to UNFCCC). Consequently, during the 5-year project period, slightly over 235 tonnes of CO_2 would have been avoided as a direct result of renewable energy-based electricity generation[5]. Furthermore, 185 tonnes of CO_2/year would continue to be avoided annually over the remaining almost 18 years of useful life of the equipment. Thus, the total direct emission reduction, without replication, over a 20-year projected equipment life will be 3,565 tCO_2 (235 tonnes + 18 years x 185 tonnes/year).

The 10 mini-grids to be developed during the 5-year project timeframe range between 5 kW and 15 kW in installed capacity, with the capacity at each site determined on the basis of anticipated consumer demand for electricity services. It is recognised that the demand for these services will gradually increase over time and this will be facilitated by the modular configurations of both the PV and mini-hydro installations that lend themselves to the addition of increased capacities related to the growth in demand. This "scaling-up" is expected to reach an average of 100 kW of renewable energy-based installed capacity per site/mini-grid covering an additional 50 villages over the years immediately following the project period, i.e. during the immediate post-project period. With regard to the Energy Centres (EC), it is expected that "scaling-up" will result in an additional 10 ECs being established post-project.

Hence, on the understanding that the additional 50 mini-grids will become operational immediately post-project and extrapolating from the average of 18.5 tonnes of CO_2/year avoided per site (on the basis of the 10 sites to be developed during the project timeframe) it is estimated that some 185,000 tonnes of CO_2 will be avoided as direct post-project GHG impact over the 20-year lifetime of the installed equipment (18.5 tonnes of CO_2/year/10kW average installation at each site x 10 (to account for 100 kW installation/site) x 50 sites x 20-year lifetime of the installed equipment).

Each Energy Centre (EC) will service 5 neighbouring villages totalling around 400 households (hh), 95% of whom use paraffin (kerosene) or candles for lighting (ref. page 7 above). For the targeted 20 ECs (10 ECs during the project + another 10 ECs immediate post-project) in total, that would represent 7,600 (400 hh x 0.95 x 20 ECs) households who can potentially benefit by replacing paraffin use with solar lanterns. Using figures provided in the Emissions Reduction Profile for Lesotho prepared by UNEP Risoe, some of 3,600 tCO_2 avoided per year [7,600 hh x 0.5 litres x 2.6kgCO_2/litre x 365 days/1,000]. With an expected lifetime of 5 years for solar lanterns, the total amount of GHG avoided will be 18,000 tCO_2. Improved cook stoves would result in about 1,423 tCO_2 avoided per year, resulting in a total of 7,115 tCO_2 over the 5-year lifetime of improved cook stoves (ref. page 24 above).

In light of the above, a total of 213,680 tonnes of CO_2 will be abated during the project/immediate post-project period, resulting in a direct abatement cost $ 16/tonne of CO_2. In this connection, Renewable Energy World reported in March 2016 the following on the Social Cost of Carbon: "The (New York) PSC (Public Service Commission) determined that

[5] This computation excludes any additional benefits in terms of GHG reduction that the Energy Centres will bring along through the sale of small renewable energy/energy efficient equipment and appliances that the rural population will have access to.

the best way to value avoided carbon emissions is by using the Social Cost of Carbon, which measures the overall cost to society from each ton of Carbon Dioxide (CO_2) emitted, and as of 2015, it costs society about $ 40 per ton".

Finally, under the assumption of great interest generated in renewable energy-based mini-grids during project implementation and given a conducive environment for investment that the project would have created, it is highly likely that many more such mini-grids will be built over a post-project period of 10 years, exceeding by several times the number installed during the 5-year project and immediate post-project implementation; this is especially so in view of the expression of interest from donors to promote implementation of scaling-up in case of successful results achieved under this project. Thus, in the case of the bottom-up approach, with a replication factor of 3, the indirect post-project emission avoided would be 641,040 tonnes of CO_2.

Table 8: Project GHG emission reduction impacts

Time-frame	Direct project/immediate post-project (20-year equipment projected life).	Indirect post-project (bottom-up) over next 10 years of project influence.
Total CO_2 emissions reduced (tonnes)	213,680	641,040

ANNEX 6. SOCIAL AND ENVIRONMENTAL SCREENING TEMPLATE

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document. Please refer to the Social and Environmental Screening Procedure and Toolkit for guidance on how to answer the 6 questions.

Project Information

Project Information	
1. Project Title	**Development of Cornerstone Public Policies and Institutional Capacities to accelerate Sustainable Energy for All (SE4All) Progress.**
2. Project Number	PIMS 5367; Atlas Award ID 00082649
3. Location (Global/Region/Country)	Lesotho

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?
Briefly describe in the space below how the Project mainstreams the human-rights based approach
The project fully endorses the human rights-based approach and will not lead to any adverse impacts on enjoyment of human rights (civil, political, economic, environmental, social or cultural) of any key or potential stakeholders, communities involved or the population at large. **The project will focus on the provision of decentralized modern energy services to the rural population and, in the process, demonstrate the benefits that renewable energy technologies can provide to improve livelihoods in the rural areas. These relate to social and economic benefits in the villages in terms of a healthier environment for the rural population, opportunities for income-generating activities and improved natural resource management. In addition, the utilisation of renewable energy for the provision of these services, in lieu of imported fossil fuel, will reduce the country's GHG emissions and contribute to a safer environment for the rural population.**
Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment
Gender is an important aspect of national SE4ALL Action Plans as women and men have different access to resources and opportunities and are affected differently by energy programmes and policies. The aim of gender mainstreaming is to ensure that the needs of both women and men are taken into account. Gender experts will be included in the Country Action Agenda (CAA) coordination mechanism and stakeholder consultations will purposefully include women and men. As part of the national action planning process for the CAA and IP (Investment Prospectus), the project will encourage capacity development activities to be undertaken on gender analysis and mainstreaming tools. **Moreover the baseline data collection under Component #1 will establish gender-disaggregated baseline information to inform the formulation of SE4A goals, targets and activities for the CAA and IP. Gender sensitive indicators, including gender-disaggregated data, will form part of the SE4ALL Action Plan monitoring framework to evaluate gender outcomes and the effectiveness of gender mainstreaming efforts.**
Briefly describe in the space below how the Project mainstreams environmental sustainability

Lesotho will draw upon all their strategies for addressing climate change to systematically mainstream climate change considerations in their SE4ALL Action Plans, including the CAA and IP. This will aid decision-making on energy infrastructure and service delivery options to take into account the uncertainty associated with climate change predictions and to assess the climate resilience of different options. For instance, decisions to invest in hydropower should take into account possible changes in the hydrology regime (including possible changes in precipitation patterns, increased demand for irrigation, and associated energy inputs). The project will ensure that the agencies tasked with the country's climate change portfolio are actively engaged in the SE4ALL coordination mechanism so as to promote an integrated approach.

The project will have a direct positive effect on environmental sustainability, as the primary objective of the project is to accelerate utilisation of renewable energy technologies for the global good of the rural population. This will be beneficial to both the country's economy and to the global environment, through the reduction of greenhouse gas emissions.

The estimated direct total reduction of CO_2 emissions resulting from project activities without replication is estimated at 3,565 tonnes, while the estimated post-project CO_2 emissions reduction with replication over the next 10 years of project influence is estimated at 208,450 tonnes.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses). If no risks have been identified in Attachment 1 then note "No Risks Identified" and skip to Question 4 and Select "Low Risk". Questions 5 and 6 not required for Low Risk Projects.*	**QUESTION 3: What is the level of significance of the potential social and environmental risks?** *Note: Respond to Questions 4 and 5 below before proceeding to Question 6*			**QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?**
Risk Description	***Impact and Probability (1-5)***	***Significance (Low, Moderate, High)***	***Comments***	***Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.***
Risk 1: Environmental / Climate Change: There are multiple environmental risks, as outlined in Lesotho's Second National Communication to UNFCCC (e.g. reduced rainfall that can affect water flows, land and watershed degradation due to erosion and population pressures) that can affect energy planning and infrastructure investments.	I = 3 P = 3	Moderate		These risks are being and will continue to be addressed through capacity development of Government staff on the key aspects to address national challenges associated with weather, climate and climate change.
Risk 2: Disposal of batteries in solar lanterns purchased from Energy Centres: While the batteries at mini-grids will be centrally located and used batteries will need to be disposed of responsibly/recycled to eliminate harmful	I = 3 P = 3	Moderate		This risk will be managed through sensitising the rural population to return used lantern batteries to the Energy Centres where they will receive a rebate on the next product they

elements, the batteries in solar lanterns sold to consumers not connected to the mini-grid may be disposed of outside the homes as trash. This may contaminate the water table and pose a risk to children who unknowingly get to use them as toys.				purchase. The Energy Centre will then ensure proper recycling of the batteries.

	QUESTION 4: What is the overall Project risk categorization?		
	Select one (see SESP for guidance)		**Comments**
	Low Risk	☐	
	Moderate Risk	☒	
	High Risk	☐	
	QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
	Check all that apply		**Comments**
	Principle 1: Human Rights	☐	
	Principle 2: Gender Equality and Women's Empowerment	☐	
	1. Biodiversity Conservation and Natural Resource Management	☐	
	2. Climate Change Mitigation and Adaptation	☒	
	3. Community Health, Safety and Working Conditions	☐	
	4. Cultural Heritage	☐	
	5. Displacement and Resettlement	☐	
	6. Indigenous Peoples	☐	
	7. Pollution Prevention and Resource Efficiency	☒	

Final Sign Off

Signature	*Date*	*Description*
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		
Principles 1: Human Rights		**Answer (Yes/No)**
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	**No**
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [6]	**No**
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	**No**
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	**No**
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	**No**
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	**No**
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	**No**
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	**No**
Principle 2: Gender Equality and Women's Empowerment		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	**No**
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	**No**
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	**No**
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	**No**
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	**No**

[6] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	**No**
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	**No**
1.4	Would Project activities pose risks to endangered species?	**No**
1.5	Would the Project pose a risk of introducing invasive alien species?	**No**
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	**No**
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	**No**
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	**No**
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	**No**
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	**No**
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	**No**
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant[7] greenhouse gas emissions or may exacerbate climate change?	**No**
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	**Yes**
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	**No**
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	**No**
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	**No**
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	**No**
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	**No**
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	**No**

[7] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	**No**
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	**No**
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	**No**
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	**No**
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	**No**
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	**No**
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	**No**
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	**No**
5.3	Is there a risk that the Project would lead to forced evictions?[8]	**No**
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	**No**
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	**No**
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	**No**
6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? *If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.*	**No**
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	**No**
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	**No**

[8] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	**No**
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	**No**
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	**No**
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	**No**
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	**No**
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	**Yes**
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	**No**
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	**No**
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	**No**

Annex 7: Agreement on Direct Project Costs

Dear Ms. Teboho Mokela,

Letter of Agreement between UNDP and the Lesotho Government for the Provision of Support Services

1. Reference is made to consultations between officials of the Government of Lesotho (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:

(a) Identification and/or recruitment of project and programme personnel;

(b) Identification and facilitation of training activities;

(c) Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of the project, the annex to the project document is revised with the mutual agreement of the UNDP Resident Representative and the designated institution.

5. The relevant provisions of the Standard Basic Assistance Agreement (SBAA) between the Lesotho Government and the UNDP of the ……..(the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP

Karla R. Hershey

UNDP Resident Representative

_____

For the Government

Ms. Teboho Mokela

Principal Secretary (Acting)

Ministry of Development Planning

Date:……..

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between Ministry of Development Planning, the institution designated by the Government of Lesotho and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project **"**Development of Cornerstone Public Policies and Institutional Capacities to accelerate Sustainable Energy for All (SE4All) Progress" Project (PMIS – 5367).

2. In accordance with the provisions of the letter of agreement signed on …….. and the project document, the UNDP country office shall provide support services for the Project as described below.

Support services to be provided:

Support services (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
Services related to human resources (including but not limited to): 1. Identification, selection and recruitment of project personnel (including advertising, short-listing and recruiting): ○ Project Associate 2. HR & Benefits Administration & Management: ○ issuance of a contract; ○ closing the contract 3. Personnel management services: Payroll & Banking Administration & Management	April 2016 – June 2016 Ongoing throughout project implementation when applicable Ongoing throughout project implementation when applicable	1 year @ $ 615.79 = 615.79 4 years @ $ 184.74 = 738.96 4 years @ $ 215.53 = 862.12 Sub-total = 2,216.87	UNDP will directly charge the project
Services related to procurement (including but not limited to): Procurement of goods	Throughout project implementation when applicable	1 year @ $ 883.90 = 883.90	UNDP will directly charge the project

Procurement of services o Consultant recruitment o Advertising o Short-listing & selection o Contract issuance			
Services related to finance (including but not limited to): o Payments o Fund Transfers	Ongoing throughout implementation when applicable	Payment 3.5 times in a month for 4 years @ 48.7 = 8,818	UNDP will directly charge the project
Services related administration (including but not limited to): o Travel authorization o Ticket requests (booking, purchasing, etc.) o F10 settlements o Asset management	Ongoing throughout implementation when applicable	Payment 2 times in a month for 4 years @ 89.78 = 8,618.88	UNDP will directly charge the project
Services related to ICT (including but not limited to): o Email box maintenance o ICT and office equipment installation and maintenance o Internet channel use o Mobile telephony contracting and use	Ongoing throughout implementation when applicable	Payment 2 times in a year for 4 years @ 789.89 = 6,319.12	UNDP will directly charge the project
Total		**Approximate-** **26,806 USD**	

3. Description of functions and responsibilities of the parties involved:

<u>UNDP Responsibilities</u>

Lesotho UNDP country office will provide support services for nationally managed project including:

- Identification and recruitment of the project personnel
- Identification and recruitment of the project consultants
- Identification and facilitation of training activities
- Procurement of goods and services

<u>Lesotho Government Responsibilities</u>

- Overall management of the project through the Ministry of Energy and Meteorology.
- Initiate and authorize processing of all support services.