



The Government of the Kingdom of Lesotho

# **Technology Needs Assessment for Climate Change Mitigation**

## **Report III**

### **Technology Action Plan for Energy and Agriculture, Forestry and Other Land Use (AFOLU) Sectors**

**Ministry of Environment and Forestry**

**September 2024**



# TNA TECHNOLOGY NEEDS ASSESSMENT



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## Foreword

Lesotho has fragile ecosystems due to its topography, type and pattern of rainfall, erodibility of soils, land use patterns and other habitats such as bogs and sponges. Lesotho is already experiencing the negative effects of climate change, including an increased frequency of extreme events such as droughts, higher rates of soil erosion and desertification, and reduced soil fertility. The country is likely to become generally hotter and drier in projected future climates. Likewise, Lesotho will also continue to experience extreme events like droughts, floods, and other climate-related hazards, in addition to continued rainfall variability and increasing temperatures. This will likely result in adverse environmental impacts such as soil erosion, deforestation, recurrent droughts, desertification, land degradation, and the loss of biodiversity, including wildlife. Key sectors such as agriculture and livestock, health, water resources, and tourism are increasingly vulnerable.

Given the country's vulnerability to the effects of climate change, Lesotho has made climate change a top priority. Lesotho is a signatory to the United Nations Framework Convention on Climate Change, has ratified the Kyoto Protocol and the Paris Agreement, and has recently revised its Determined Contribution (NDC). Despite its negligible contribution to global greenhouse gas emissions, the revised NDC notably plans to achieve carbon neutrality by 2050. International climate finance is critical to meeting NDC targets, but Lesotho also needs assistance with capacity building and the dissemination of climate-smart technologies.

The problem of a lack of technological innovation and development is widespread in the developing world, and Lesotho is no exception. Furthermore, there are a number of impediments to the widespread adoption of technologies in the country. This report is the result of a multi-stakeholder process conducted as part of the TNA project, which identified barriers to the prioritized technologies, measures to overcome those barriers, and a technology action plan for the potential sectors. Lesotho started its TNA process in 2020 as part of the TNA IV project and has prioritized the agriculture and water sectors for adaptation, as well as energy and agriculture, forestry, and other land use (AFOLU) for mitigation. It is hoped that this report will serve as a valuable reference document for all levels of government and development actors as they implement prioritized technologies to address climate change.

The current TNA Report III includes the Technology Action Plan (TAP) and Project Idea Notes, which build on the findings of the previous TNA Reports I and II. The TAP outlines specific steps and tasks needed for successful technology implementation and suggests investment opportunities for each technology. By implementing these technologies, Lesotho can effectively reduce GHG emissions and improve resilience to climate change impacts. This involves transferring and disseminating prioritized technologies and addressing barriers to their adoption. It is essential for Lesotho to adopt measures and technologies that align with its Nationally Determined Contributions, while also promoting synergies between adaptation and mitigation efforts in response to climate change. The proposed project ideas will be used to formulate bankable proposals for funding from different climate-related sources under the UNFCCC and other bilateral and multilateral agreements.

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## Acronyms and Abbreviations

AFOLU	Agriculture, Forestry, and Other Land Use
AR4	Fourth Assessment Report of the IPCC
ATP	Ability to Pay
BAU	Business as Usual
BOS	Bureau of Statistics
CBOs	Community Based Organizations
CFLs	Compact Fluorescent Lamps
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	CO <sub>2</sub> -equivalent
CSOs	Civil Society Organizations
DoAR	Department of Agricultural Research
DoC	Department of Crops
DoE	Department of Energy
DOE	Department of Environment
DOF	Department of Forestry
DoSWC	Department of Soil and Water Conservation
DWA	Department of Water Affairs
EF	Emission factor
GHG	Greenhouse Gas
GoL	Government of Lesotho
ILBs	Incandescent Lamp Bulbs
INC	Initial National Communication
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
LDCs	Least Developed Countries
LED	Light-Emitting Diode
LMS	Lesotho Meteorological Services
LPG	Liquefied Petroleum Gas
LSL	Maloti (local currency) pegged to the South African rand on a 1:1 basis
LVAC	Lesotho Vulnerability Assessment Committee
MDGs	Millennium Development Goals
ME	Ministry of Energy
MEF	Ministry of Environment and Forestry
MFDP	Ministry of Finance and Development Planning
MtCO <sub>2</sub> e	Million tonnes of carbon dioxide equivalent
NAMA	National Appropriate Mitigation Actions
NAPA	National Adaptation Programme of Action
NCCC	National Climate Change Committee
NCCP	National Climate Change Policy 2017 – 2027
NDC	Nationally Determined Contributions
NEP	National Energy Policy 2015 – 2025
NSDP	National Strategic Development Plan
PPP	Public Private Partnership
SDGs	Sustainable Development Goals
SMG	Solar PV Mini-Grid
SNC	Second National Communication
Solar PVs	Solar Photovoltaic technology
SMG	Solar Mini-Grid
tCO <sub>2</sub> e	Tonnes of CO <sub>2</sub> equivalent
TNA	Technology Needs Assessment
TNC	Third National Communication
TAPs	Technology Action Plans
TVET	Technical and Vocational Education and Training
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNEP CCC	UN Environment Programme (UNEP) Copenhagen Climate Centre
USD	United States of America Dollar
WTP	Willingness to pay

## Glossary of Terms<sup>1</sup>

Greenhouse Gases	Gases within the Earth's atmosphere, principally water vapour, carbon dioxide, methane, nitrous oxide and ozone, the increasing concentrations of which are raising the Earth's average temperature and causing a range of other adverse climate and weather effects.
Low Carbon	Technology, including transport, that emits minimal carbon dioxide into the atmosphere or, in the case of 'zero carbon', emits no carbon dioxide at all.
Mitigation	An anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks (IPCC, 2007a; glossary).
Technologies for Mitigation and Adaptation	All technologies that can be applied in the process of minimizing greenhouse gas emissions and adapting to climatic variability and climate change, respectively.
Technology Needs Assessment	A set of country-driven activities that identify and determine the mitigation and adaptation technology priorities of Parties other than developed country Parties, and other developed Parties not included in Annex II, particularly developing country Parties. They involve different stakeholders in a consultative process and identify the barriers to technology transfer and measures to address these barriers through sectoral analyses. These activities may address soft and hard technologies, such as mitigation and adaptation technologies, identify regulatory options and develop fiscal and financial incentives and capacity building.
Technology Transfer	The exchange of knowledge, hardware and associated software, money and goods among stakeholders, which leads to the spreading of technology for adaptation or mitigation. The term encompasses both diffusion of technologies and technological cooperation across and within countries.

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<sup>1</sup> UNDP (2009).

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## Executive Summary

The Technology Needs Assessment Report III marks the third and final phase of the TNA process, building upon the finding of the previous reports, "*Technology Needs Assessment (TNA Report I)*" and "*Barrier Analysis and Enabling Framework for Mitigation (TNA Report II)*". In Report I, technologies for climate change mitigation in Lesotho's energy and Agriculture, Forestry and Other Land Use (AFOLU) sectors were identified and prioritised using multi-criteria analysis (MCA). The prioritised technologies in the respective sectors include:

s/n	Energy Sector	AFOLU Sector
1	Efficient Cooking Technologies	Biogas Technology
2	Solar PV Minigrids	Agroforestry Technology
3	Energy-Efficient Lighting and Appliances (Residential and Commercial):	

Report II documents the barriers impeding the acquisition, deployment and diffusion of the prioritized technologies in the country. It discusses in detail the appropriate measures to overcome the identified barriers and create an enabling environment for the implementation of the prioritized energy and AFOLU sectors' technologies.

The TAP report (Report III) is intended to serve as a strategic tool for securing funds at the national, regional, and international levels to facilitate the successful diffusion of the prioritized mitigation technologies. It provides valuable information for national and international stakeholders for the purposes of planning, improving coordination and collaboration among responsible bodies and promoting mitigation technologies. The TAP defines actions and activities, funding sources, responsible bodies and focal points, timeframes, risks, success criteria, budget per activity and indicators for monitoring implementation. Some of the TAP's actions and activities are developed further as Project Ideas in order to secure funding for implementation.

To produce the TAPs the following processes were followed:

- The ambition of the TAP was provided,
- Actions and activities selected for inclusion in the TAP were outlined,
- Stakeholders and timelines for implementation were listed,
- Scheduling and sequencing of activities were provided,
- Summary costs and resources needed for actions and activities were estimated,
- Technological action plans for mitigation technologies were developed,
- Management planning including risk management and contingency measures were identified,
- Summary of immediate requirements and critical steps for implementation were provided, and finally
- Project ideas were developed.

### Crosscutting Actions

During the report development, it was noted that two consistent actions were present in all the TAPs. The first action focused on **Financial Accessibility and Affordability**, highlighting the challenge faced by Lesotho in having qualified personnel to prepare bankable proposals for securing



international funding. In most cases, funding was secured with the assistance of international partners rather than through local fundraising efforts. Accessing finance was identified as a crucial action for all TAPs. To address this, individuals will receive training in writing bankable project proposals to improve finance accessibility for all TAPs.

The second common issue was **Capacity Building, Training, and Awareness**. Each TAP required some form of capacity building and awareness-raising. Different technologies have various stakeholders who can be engaged through various platforms such as print media, traditional electronic media, social media, meetings, workshops, road shows, and community gatherings. The budget allocation is expected to vary among the technologies.

The following are the next steps that should be taken as soon as possible for TAP development in the country's energy sector:

- The Ministry of Environment and Forestry (MEF), in collaboration with the Ministry of Energy (ME), should ensure that the TAP's outcomes receive the necessary approvals.
- Project proposals should be promptly developed based on the project ideas.
- Early engagement with development partners by the government is essential to secure financing for TAP projects and meet activity timelines.

## **Energy Sector**

The primary sources of emissions from residential fuel combustion stem from the use of inefficient traditional biomass-fired stoves, paraffin, and the importation of energy from predominantly fossil-based generation systems like Eskom. Lighting in the majority of peri-urban and rural households is still commonly provided by incandescent lamps (ILBs) and compact fluorescent lamps (CFLs). Lighting demand often aligns with peak demand, particularly in the winter when early sunsets lead to increased evening demand. The adoption of energy-efficient lighting technologies, such as LEDs, can substantially reduce evening peak demand and the associated higher tariffs. Technologies in the energy sector are categorized into two sub-sectors: electricity production and energy consumption.

Lesotho is faced with both promising opportunities and challenges in energy access and sustainability, necessitating the implementation of innovative solutions. This Technology Action Plan focuses on three key areas: Efficient Cookstove Technology, Solar PV Minigrids and Energy-Efficient Lighting and Appliances. By strategically deploying these technologies, Lesotho aims to decrease carbon emissions, enhance energy efficiency and advance sustainable development.

- **Efficient Cookstove Technology:** Traditional cooking methods prevalent in Lesotho contribute to deforestation and indoor air pollution. Introducing efficient cookstoves offers a sustainable alternative, reducing fuel consumption and emissions while improving cooking efficiency. The plan involves widespread distribution, community education and subsidy programs to facilitate the adoption of efficient cookstoves across the country.
- **Solar PV Minigrids:** Many rural areas in Lesotho lack access to reliable electricity grids, hindering socioeconomic progress. Minigrids can provide clean, reliable electricity to rural areas that lack access to the national grid. This allows communities to transition away from burning wood, charcoal, or kerosene for lighting and cooking, which reduces GHGs emissions and deforestation. By building renewable energy infrastructure now, Lesotho can avoid locking in fossil fuel-based technologies that would generate emissions for decades to come. The action plan includes the installation of solar PV minigrids in underserved areas, supported by government incentives, public-private partnerships, and community engagement initiatives.

- **Energy-Efficient Lighting and Appliances:** Inefficient lighting and appliances contribute to energy wastage and environmental degradation. Promoting energy-efficient alternatives such as LED lighting and high-efficiency refrigerators, TV sets, and other household appliances can significantly reduce energy consumption. Many rural areas rely on kerosene lamps for lighting, which burn fossil fuels and release GHG gases and black carbon. Solar LED lanterns, on the other hand, use renewable solar energy, eliminating the need for kerosene and reducing carbon emissions associated with lighting. The plan advocates for awareness campaigns, market incentives, and regulatory measures to accelerate the adoption of energy-efficient technologies nationwide.

**Implementation Strategy:** The successful execution of the TAP depends on a collaborative approach that involves key government agencies, NGOs, private sector stakeholders, and local communities. Key strategies encompass:

1. **Policy Alignment:** Enacting supportive policies and regulations to incentivize the adoption of clean energy technologies.
2. **Capacity Development:** Training programs to empower local technicians and entrepreneurs in technology deployment and maintenance.
3. **Financing Mechanisms:** Establishing accessible financing options, including grants and microfinance schemes, to facilitate technology adoption.
4. **Public Engagement:** Conducting outreach campaigns to raise awareness and promote community participation in mitigation efforts.
5. **Monitoring and Evaluation:** Implementing effective monitoring systems to track progress, identify challenges, and ensure accountability in technology deployment. Integrate gender-sensitive indicators into monitoring and evaluation frameworks to assess progress and outcomes.
6. **Partnerships and Collaboration:** Fostering partnerships with gender-focused organizations and networks to leverage expertise and resources in promoting gender equality through technology initiatives.

This Technology Action Plan presents a holistic strategy to address Lesotho's energy challenges while advancing climate mitigation efforts. Through the widespread adoption of efficient cookstoves, solar PV minigrids, and energy-efficient lighting and appliances, Lesotho can achieve sustainable development goals, enhance energy access, and contribute to global climate action initiatives.

### **AFOLU Sector**

Loss of carbon due to land degradation is a key source of GHG emissions from land sources. Poor land management and high soil erosion by wind and water are primary environmental challenges in the country. Livestock, particularly cattle, sheep and goats are also significant sources of GHG emissions from the AFOLU sector. Sources of emissions from livestock are enteric fermentation and manure management systems that result in methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Sustainable use of animal and other organic waste by adoption of biogas technologies and prevention of land degradation through improved land management practices (i.e., agroforestry systems) can have major GHG mitigation impacts together with other environmental and social benefits that include improved soil fertility, food and nutrition security.

Lesotho's geographic position and landscape that are characterized by high rainfall variability and complex terrain favour livestock production over crops. This TAP explores GHG mitigation opportunities that can be achieved by adopting biogas and agroforestry technologies in the country. By

adopting these technologies, the country will also be striving to achieve sustainable development goals and the broader sustainable development.

- **Biogas digester technology:** Animals are usually kept in the kraals (or enclosures) at night in the country. Households use dry cow dung for fuel, causing inefficient cooking and space heating practices. Traditional fires from animal dung can also cause poor air quality in the homes and may require women and girls to collect the dung in the communal grazing lands. In addition to mitigating GHG emissions, adoption of biogas technologies will produce sustainable energy and organic manure from the slurry which can be used in the homestead gardens and orchards. The aim is to implement this technology in the lowlands of the country where soil temperatures may not significantly decrease in winter as compared to the highlands. Temperatures affect efficiency of the technology.
- **Agroforestry systems.** Climatology of Lesotho supports production of orchards. On the other hand, frequent droughts often affect livestock by depleting feedstocks from rangelands. Agroforestry systems which can have combinations of trees with animal fodder and/or vegetables can prevent land degradation, improve food security and sequester carbon. The implementation of the TAP will have production of the agroforestry systems in the country especially in parts of the country where land degradation is a challenge.

**Implementation Strategy:** Successful implementation of these technologies will require collaborations between central government, local government, civil society, research and training institutions, farmers (beneficiaries) and extension services. Key strategies encompass the following:

1. **Policy Alignment:** Successful implementation of AFOLU TAPs can be achieved when there are policies and regulations supporting these technologies (biogas and agroforestry). These policies will need to be aligned with primary national plans.
2. **Capacity Development:** Capacity building activities will be required to empower officials, beneficiaries and technicians that will be installing and maintaining the technologies. Capacity building will need to be sensitive to issues of gender equity.
3. **Financing Mechanisms:** Establishing sustainable, predictable and accessible financing options for the technologies. Sources of funding can include public resources, multilateral institutions and the private sector.
4. **Public Engagement:** Promote public participation by conducting outreach programs using appropriate and accessible communication platforms/channels.
5. **Monitoring and Evaluation:** Develop and implement effective monitoring and evaluation systems to improve management of outputs, outcomes and impact of each technology implementation. It is important that gender related indicators are included in the parameters that will be monitored and evaluated.
6. **Partnerships and Collaboration:** Effective partnerships and collaborations between stakeholders and institutions that have relevant technology experience improves success rate of technology implementation.

Through the implementation of these TAPs, Lesotho can achieve GHG mitigation benefits, food and energy security as well as improvement in environmental conditions including soil fertility and conservation.

# Chapter 1 : Technology Action Plan and Project Ideas for the Energy Sector

## 1.1 Technology Action Plan for Energy Sector

This chapter is dedicated to the Technology Action Plan (TAP) in the energy sector, which encompasses the following three technologies: Efficient Cookstoves, Solar PV Minigrid Systems, and Energy-Efficient Lighting and Appliances.

### 1.1.1 Energy sector overview

The subsequent sections will present an overview of the energy sector in Lesotho, concentrating on the supply and consumption of energy across different sectors, and examining the challenges and solutions. It will cover the sector's function, greenhouse gas (GHG) emissions, susceptibility, prevailing policies, and the implementation of technology. Included will be a table detailing existing legislation, regulations, and policies, complete with their titles, dates of enactment and revision, principal contents, and profiles of current technologies. Furthermore, selected technologies from the Technology Needs Assessment (TNA) report will be succinctly outlined, together with their present adoption rates and prospective goals.

Within the energy sector, two sub-sectors are identified for mitigation options: electricity generation and consumption, and energy consumption in commercial and residential areas. The main sources of GHG emission from residential sector are the use of inefficient traditional biomass-fired stoves, paraffin, and energy imported from predominantly fossil-based generation systems like Eskom. Lighting is typically provided by incandescent lamps (ILBs) and compact fluorescent lamps (CFLs), with lighting demand coinciding with peak demand, especially during winter when early sunsets result in higher evening demand. Transitioning to energy-efficient appliances and lighting technologies, like LEDs, can significantly lower evening peak demand and the related higher tariffs.

**Current Technology Profile:** The majority of the population in Lesotho lives in rural areas and has limited access to the electricity grid. Consequently, they rely on traditional biomass for basic household energy needs, which contributes to environmental degradation and exposure to household air pollution. Lesotho's overall electricity access rate is approximately 50% of the population, dropping to under 40% in rural areas compared to 80% in urban areas. This disparity hampers socioeconomic development, particularly in education, health, and rural economic sectors. Firewood remains a critical energy source in Lesotho, with many rural households continuing to use it for cooking and heating despite efforts to increase electrification rates.

Lesotho primarily generates electricity through the 'Muela and Mantšonyane hydropower stations, which produce about 72 MW and 2 MW respectively, complemented by the Ramarothole Solar Power Plant with a capacity of around 30 MWp. Despite the increase in Lesotho's electricity production, it still falls short of the rising domestic demand, necessitating imports from ESKOM in South Africa and EDM in Mozambique, as part of the Southern African Power Pool (SAPP).

Lesotho's energy sector grapples with issues such as limited access to modern (AGECC, 2010) and clean energy sources, a dependence on imported energy, and shrinking forest reserves. The International Energy Agency states that access to affordable, modern energy sources is crucial for reducing poverty, fostering economic growth, improving health, and enhancing productivity<sup>2</sup>. Lesotho's significant

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<sup>2</sup> World Energy Outlook, "WEO – Modern Energy for All: Why it Matters," available at <http://www.worldenergyoutlook.org/resources/energydevelopment/modernenergyforallwhyitmatters/>

dependence on imported electricity and fossil fuels exposes it to the risks of supply disruptions and price volatility. Deforestation, primarily due to the rural demand for wood fuel, has resulted in reduced forest cover, leading to increased wood fuel imports and a shift to alternative fuels such as crop waste, dung, and LPG. These changes adversely affect soil fertility and increase the financial and time burden on households in securing fuel (Lesotho Bureau of Statistics, 2019).

- **Transportation:** Road transport is dominant in Lesotho, heavily dependent on imported petroleum products.
- **Solar Power:** Lesotho receives an annual average solar radiation of 5.4 kWh/m<sup>2</sup> per day, offering substantial opportunities for solar energy utilization.
- **Wind Power:** With an average wind speed ranging from 3.5 to 25 m/s, Lesotho shows promising potential for wind energy initiatives<sup>3</sup>.

**Role of the Sector:** The energy sector plays a pivotal role in driving the national economy and is a crucial facilitator of socio-economic development and transformation, as detailed in the National Strategic Development Plan II (2023/24 – 2027/2028). It is essential for various sectors such as transportation (petrol and diesel), manufacturing (electricity, coal, wood chips, and paraffin), agriculture (diesel and electricity), as well as commercial and domestic uses (electricity, wood fuel, liquefied petroleum gas, and paraffin). GHG emissions arise from the production, transformation, delivery, and consumption of energy resources. The energy sector provides a more precise calculation of GHG emissions than other sectors, which supports the accurate evaluation of GHG reduction or the avoidance of emissions through mitigation strategies. The sector is susceptible to adverse climate changes that could disrupt energy supply, particularly hydropower and biomass supply. Climate change impacts, such as increased droughts, floods, and heat waves, pose significant risks. The electricity sector's heavy reliance on hydropower makes it particularly vulnerable to climate change effects. It is essential to optimize the energy mix to address these climate change risks effectively.

**GHG Emissions and Trends:** Lesotho's GHG emissions were 5 617.26 Gg CO<sub>2</sub>e in 2011, decreased slightly to 5 304.02 Gg CO<sub>2</sub>e in 2013, and then rose again to 5 660.44 Gg CO<sub>2</sub>e in 2017. The AFOLU sector was the largest contributor to national GHG emissions in 2011 at 2 690.41 Gg CO<sub>2</sub>e (47.9%), followed closely by the energy sector at 2 583.61 Gg CO<sub>2</sub>e (46%). By 2017, the energy sector, including, became the largest contributor to the inventory at 2 861.17 Gg CO<sub>2</sub>e (50.5%), with AFOLU at 2 416.97 Gg CO<sub>2</sub>e (42.7%). Carbon dioxide (CO<sub>2</sub>) has been the prominent gas in Lesotho's GHG inventories, accounting for 60.6% in 2011 and 62.4% in 2017. On average, methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) have contributed 24.2% and 13.0% respectively from 2011 to 2017 (LMS, 2021).

Lesotho's GHG emissions increased by 83.7% from 3 080.7 Gg CO<sub>2</sub>e in 1994 to 5 660.44 Gg CO<sub>2</sub>e in 2017 with an average annual growth rate of 3.64%. The energy sector saw a 245.9% increase, while the AFOLU sector increased by 9.9%. The waste sector experienced the fastest growth rate, followed by the energy and industrial sectors. The overall increase in total GHG emissions closely mirrored the trend in emissions from the energy sector, which accounted for 46% to 50.5% of total emissions during this period. This significant emission growth reflects the rising energy demand driven by changing socio-economic conditions and overall economic development in the country. In contrast, GHG emissions from the AFOLU sector remained relatively stable, with an average annual growth rate of 0.43% from 1994 to 2017, primarily due to a decrease in livestock population and forest fires.

The inventory highlighted the country's dependence on fossil fuel imports and the substantial contribution of the energy sector to GHG emissions. In 2011, Lesotho's GHG emissions from the

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<sup>3</sup> [https://energypedia.info/wiki/Lesotho\\_Energy\\_Situation](https://energypedia.info/wiki/Lesotho_Energy_Situation)

energy sector were 2 583.6 Gg CO<sub>2</sub>e, increasing steadily to 2 861.2 Gg CO<sub>2</sub>e by 2017. The residential sub-sector, particularly the burning of biomass (wood, shrubs, dung, and crop residues), accounted for the largest share of emissions in the sector at 66.44% in 2017. Reduced diesel and petrol consumption in 2012 and 2013 led to lower GHG emissions of 2 513.7 Gg CO<sub>2</sub>e and 2 545.5 Gg CO<sub>2</sub>e, respectively. Overall, energy sector emissions increased by 10.74% from 2011 to 2017.

Transport sector emissions were 390.65 Gg CO<sub>2</sub>e in 2011, rising to 466.85 Gg CO<sub>2</sub>e in 2017, with road transport contributing over 99% of all transport emissions. GHG emissions from commercial and institutional sectors were 384.67 Gg CO<sub>2</sub>e in 2011 and 422.46 Gg CO<sub>2</sub>e in 2017. Over the past ten years, the transport subsector has become the largest consumer of petroleum-based products in Lesotho. Petroleum product consumption increased by 14% from 227 125 kilolitres in 2016/17 to 258 972 kilolitres in 2019/20. Given the poor maintenance of vehicles in the country, it is likely that CO<sub>2</sub> emissions from the transport sector will continue to rise due to increased petroleum product consumption. Experts predict significant growth in the energy sector, leading to a corresponding increase in total GHG emissions.

Three technologies were identified for TAP development in the energy sector. They included:

1. Increasing the use of Efficient Fuelwood Cookstoves,
2. Expanding the use of Solar PV Minigrid systems for grid-connected power generation and small-scale installations
3. Increasing the use of Energy-Efficient Lighting and Appliances.

**Vulnerability:** Lesotho's energy sector vulnerability stems from its reliance on imported electricity and the impact of climate variability on hydropower generation. The country's significant dependence on imported fossil fuels, coupled with the restricted access to modern energy services in rural areas, exacerbates this issue. Additionally, the prevalent use of biomass fuels contributes to environmental degradation through deforestation and soil erosion, a trend that may persist until renewable energy technologies are economically feasible. Enhancing energy security and resilience is vital to address these challenges.

**Selected Technologies:** The selected technologies for the energy sector are briefly discussed below:

#### **Efficient cookstoves**

Over half of Lesotho's rural population, along with numerous schools and institutions, depend on traditional cooking methods involving substantial firewood use, leading to elevated CO<sub>2</sub> emissions and health concerns for those working in kitchens. Efficient cookstoves can reduce firewood consumption by 50-80%, leading to substantial cost savings. Over a 5-year period, most locally available efficient cookstoves will have saved more than the initial cost. The firewood savings from a single stove can result in a reduction of approximately 2.5 tonnes of CO<sub>2</sub> per year, helping to mitigate the global climate crisis. These cookstoves also improve indoor air quality, reducing the prevalence of respiratory diseases in kitchens, and contribute to combating unsustainable deforestation. There is less than 50% uptake of clean cooking technologies and fuels in Lesotho (IEA, 2023). This is due to the relatively high cost of clean cooking technologies and equipment compared to traditional biomass, unreliable supply of clean energy technologies, lack of financing schemes for the purchase of clean or improved cookstoves and other clean technologies, and insufficient gender awareness in the promotion of clean cooking. The average open fire will emit 1.9 kgCO<sub>2</sub> for every kilogram of wood burnt, and an extra 0.07 kg of black

carbon (soot). This equates to an average of 28.5 kgCO<sub>2</sub> emitted by a single household per day (*calculated at 15 kg of wood per day with an average of 4 people per household*)<sup>4</sup>.

Highly efficient cookstoves are not widely manufactured in Lesotho at present. However, there are two organizations and companies working to promote and implement them. The ACE One Ultra-Clean Biomass Cookstove, manufactured by African Clean Energy (ACE), and the SAVE80 Cookstoves, locally assembled by Solar Lights Ltd (Pty), are the most popular and highest efficiency cookstoves available on the market.

The SAVE80 Cookstoves are manufactured in Germany and then assembled in Lesotho by Solar Lights (Pty) Ltd. According to the manufacturer, each stove saves approximately 2 to 2.5 tCO<sub>2</sub> per year, which is more than the emissions produced by a mid-size car driven 10 000 kilometres annually<sup>5,6</sup>. The SAVE80 set reduces wood usage by 80% compared to an open fire, resulting in an 80% reduction in CO<sub>2</sub> emissions. The average CO<sub>2</sub> reduction per household (through daily use) for cooking and water boiling is approximately 2.8 tCO<sub>2</sub> annually. Over a 20-year lifespan, a SAVE80 Stove Cooking Set saves over 50 tCO<sub>2</sub>.

ACE-1 Cookstoves, produced by African Clean Energy (ACE) in Lesotho, are clean cookstoves alternatives that can burn a wide range of solid biomass. The gasifier technology of ACE-1 allows for more complete fuel combustion, resulting in lower emissions and reduced fuel consumption compared to traditional stoves. Users can cook with 50-85% less fuel compared to traditional cookstoves, leading to significant cost savings, less time spent gathering fuel, and helping to mitigate deforestation in Lesotho. The ACE-1 burns biomass fuels without producing smoke, reducing CO<sub>2</sub> and fine particulate matter (PM<sub>2.5</sub>) emissions by up to 95% compared to an open fire. Conservatively calculated, one ACE-1 clean cooking stove reduces **10 tCO<sub>2</sub> over 8 years**. These health benefits, along with fuel and time savings, help reduce gender inequalities, improve lives, and preserve forests.

The Government of Lesotho, through its research and development centre, Appropriate Technologies Services (ATS), is also working on developing affordable and efficient cook stoves that can also be used for space heating. ATS is also focused on developing other energy-efficient household technologies, such as solar fruit and vegetable driers, commercial-scale solar box cookers, and solar hot water collectors.

In summary, the implementation of efficient cookstoves offers several benefits, including:

- Reduced demand for biomass, leading to a decrease in deforestation associated with firewood consumption.
- Improved air quality is achieved through the reduction of emissions of soot particles (black carbon) and smoke.
- Reduction in GHG emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O), as well as a decrease in respiratory diseases.
- Reduction in fuel needs associated with firewood collection.
- Creation of new jobs opportunities in the production, sales, marketing and distribution of efficient stoves.

The opportunity available is the Government of Lesotho's plan to promote the uptake and sustained use of clean, modern cooking technologies through the development and enforcement of a comprehensive legal, regulatory and commercial framework for the clean cooking sector; promotion of local manufacturing of clean cooking equipment, fuels and accessories; provision of fiscal incentives e.g. subsidies, loans and tax incentives to the clean cooking sector to encourage private sector

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<sup>4</sup> <https://www.sunfire.co.za/solar-cooking-better/>

<sup>5</sup> [https://www.atmosfair.de/en/climate-protection-projects/energy\\_efficiency/lesotho/](https://www.atmosfair.de/en/climate-protection-projects/energy_efficiency/lesotho/)

<sup>6</sup> <https://cdm.unfccc.int/Projects/DB/RWTUV1323354971.78/view?cp=2>

involvement; supporting the growth of women as promoters, suppliers, leaders and manufacturers of clean cooking equipment and resources. Financing schemes for clean cooking fuels and equipment will be promoted through loans from targeted microfinance institutions, banks, Savings and Credit Cooperatives (SACCOs) or other agencies. It is also expected that National Standards, Labelling, and Certification programs will be developed and put into effect for all the chosen TAP technologies.

### **Solar PV Minigrids**

Lesotho experiences some of the highest levels of solar irradiation in the world with average daily solar irradiation ranging from 4.5 and 6.5 kWh/m<sup>2</sup>. This is significantly higher than the levels in the USA (around 3.6 kWh/m<sup>2</sup>) and Europe (around 2.5 kWh/m<sup>2</sup>). Solar energy has the highest adoption rate among renewable energy resources in Lesotho. The existing solar data shows that the solar energy resource in Lesotho remains high throughout the year, with a maximum variation of only about 36% (from 4.5 to 6.5 kWh/m<sup>2</sup>). As of December 2022, the installed capacity of solar energy-based power in Lesotho was 30.77 MW, with 30 MW being on-grid supply and 0.77 MW being off-grid generation (BoS, 2022). Opportunities within the solar PV sector are underlined by the government's ambitious target to increase electricity supply to 75% by 2038, with renewable energy resources (hydropower, solar energy and wind) expected to contribute 325.5 MW to the national electricity mix by 2040. Solar energy is planned to contribute 160 MW out of the total anticipated cumulative capacity of 401.5 MW by 2040<sup>7</sup>.

Solar PV minigrid technologies are a promising solution to meet the energy needs of urban and rural poor communities in Lesotho that are far from the national grid. They have the potential to stimulate socio-economic development and improve living standards in these deprived areas. Solar minigrids generate electricity centrally and distribute it to households and small businesses within a specific area. According to the World Bank, "minigrids are electric power generation and distribution systems that provide electricity to just a few customers in a remote settlement or bring power to hundreds of thousands of customers in a town or city" <sup>8</sup>. Solar PV minigrids consist of a solar PV array for generating electricity, a battery bank for electricity storage (in some business models), a power conditioning unit with charge controllers, inverters, AC/DC distribution boards, and necessary cabling, and a local low-tension power distribution network.

Mini-grids will play a significant role in achieving the ambitious goal of the Government of Lesotho to increase rural electricity access to 75% by 2030, as outlined in the Electrification Master Plan (Off-Grid Master Plan). The plan aims to electrify approximately 10 600 households with off-grid energy solutions and 300 households with mini-grids annually, starting in 2018 (EMP 2018). Minigrids have the potential to help Lesotho achieve SDG7 by 2030 in a cost-effective manner. While a few isolated solar PV mini-grid systems have been installed in remote communities in Lesotho through private and international initiatives, this technology is still in its early stages in the country. The Department of Energy has identified several pilot projects to kick-start the deployment of solar PV mini-grid systems.

### **Energy-Efficient Lighting (Residential and Commercial)**

In 2017, Lesotho emitted a total of 5 660.44 Gg CO<sub>2</sub>e, with 2 861.17 Gg CO<sub>2</sub>e (50.5%) coming from the energy sector. The residential sector was the largest contributor to Lesotho's energy sector emissions accounting for 1 900.86 Gg CO<sub>2</sub>e (66.3%) (LMS, 2021). The Commercial/institutional sector was the third largest contributor, responsible for 422.46 Gg CO<sub>2</sub>e (14.77%)

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<sup>7</sup> Expert analysis using available data from Department of Energy and Bureau of Statistics

<sup>8</sup> Energy Sector Management Assistance Program. 2019. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. ESMAP Technical Report;014/19. World Bank, Washington, DC. © World Bank.



Energy efficiency is a cornerstone of any effort to achieve climate, energy and development goals. This initiative focuses on the implementation of energy efficiency and management tools to enhance energy usage in commercial services and households. In commercial services, the emphasis is on using energy-efficient appliances. In households and institutions, the focus is more on adopting energy-efficient lighting technologies. These measures are designed to reduce electricity demand, avoid premature investments in energy supply, lower GHG emissions and air pollution, increase energy access and services, reduce dependence on fossil fuels, improve grid reliability, and accelerate the benefits of renewable energy.

The Energy Policy's strategic goal and focus on **Energy Efficiency** is to reduce energy losses by discouraging the use of energy-intensive devices and encouraging the adoption of energy-efficient technologies. This involves the implementation of energy efficiency programs in buildings and the introduction of incentives to support these programs and activities. The main objectives are to align the energy intensities of major industrial sectors, public institutions, and households with internationally recognized standards and best practices. The GACMO model, used in the 2024 revision of Lesotho's NDC, indicates that replacing kerosene-based lighting with 64 050 LED bulbs could lead to an annual reduction of 16.21 ktCO<sub>2</sub>e in CO<sub>2</sub> emissions. If a typical rural household in Lesotho uses two kerosene lamps and consumes about one litre of kerosene per week for lighting, the country could save 1,360 tonnes of imported kerosene annually, resulting in savings of US\$1.8 million. The revised NDC 2024 sets an ambitious target to provide approximately 64 050 solar LED lamps to rural households by 2030, replacing the use of paraffin and candles for lighting. Additionally, the strategy involves distributing approximately 50 000 LED bulbs to electrified homes, institutions, and businesses over a two-year period, replacing the use of incandescent bulbs and Compact Fluorescent Lamps (CFLs). The aim of promoting energy-efficiency measures and technologies is to help achieve a 5 MW reduction in electricity sector energy consumption by 2030, leading to a further avoidance in emissions and significant cost savings by reducing reliance on imported and costly fossil-fuel generated electricity from SAPP.

LEDs are extremely energy-efficient, which means less energy consumption and decreased burning of fossil fuels to produce electricity. Additionally, LED lamps have a lifespan of up to 100 000 hours and are very durable compared to incandescent bulbs. This means less maintenance and therefore lower maintenance expenses. The long lifespan of LEDs is a huge plus for the environment because bulbs do not need to be replaced very often, resulting in less waste in our landfills and reduced pollution created by performing maintenance tasks and producing replacement lamps.

The main sources of emissions from residential fuel combustion emanate from the use of wood, paraffin as well as the importation of energy from predominantly fossil-based generation systems by Eskom. Lighting demand tends to coincide with peak demand, especially during the winter season when the sun sets early and demand peaks in the evening. LED lighting, in particular, can lower evening peak demand, which often incurs higher tariffs.

**Current Uptake and Future Targets:** Lesotho currently has a low level of renewable energy adoption, with traditional biomass fuels being the dominant energy source. However, there is significant potential for growth in the renewable energy sector, particularly in solar and hydropower. Efforts to enhance energy access and efficiency are anticipated to spur future investments and technology implementation. The government is actively promoting the development of renewable energy technologies through initiatives such as the Lesotho Energy Policy 2015-2025. This policy aims to create a conducive environment for private sector investment in renewable energy projects, including the establishment of

a Renewable Energy Feed-In-Tariffs (REFIT) programme and the development of power purchase agreement (PPA) frameworks for independent power producers. These initiatives are expected to drive the future deployment of renewable energy technologies in Lesotho.

**Existing Policies and Measures Related to Energy Sector Development and Technology Development:** The Government of Lesotho has put in place a range of legal and regulatory frameworks to tackle energy-related issues and support efforts to mitigate climate change. These frameworks play a key role in creating a favourable environment for addressing the challenges posed by climate change and are outlined in Table 1.1 below:

**Table 1.1: Existing main policies and measures in the Energy sector**

Name of Legislation/ Act / policy, Regulation, etc.	Date Formulated / Enacted	Main Contents
National Strategic Development Plan II (2023/24 – 2027/2028) (extension) (Lesotho, 2018)	2023	The NSDP II recognizes the important role of energy in socio-economic development and highlights the importance of research and development in energy, energy efficiency, energy access, renewable energy technologies, and climate change mitigation. It also acknowledges that climate change is already impacting Lesotho with noticeable temperature and rainfall changes, which could hinder the country's ability to achieve its development objectives.
Scaling-up Renewable Energy Program (SREP) (Lesotho, 2017a)	2017	This program supports Lesotho's initiative towards achieving transformational changes that will lead to a low GHG emissions development pathway by harnessing abundant renewable energy sources such as solar energy.
The Energy Act 2024	2024	The Energy Act of 2024 established the Rural Energy Agency, whose function, among others, is to facilitate the provision of energy services in rural areas and ensure the availability of commercial and modern energy sources and technologies. The Energy Act is expected to substantially reform the energy sector with an effective institutional, regulatory, and legal framework. Among other provisions, the Energy Act includes measures relating to renewable energy, energy efficiency, promotion of the use of renewable energy, energy efficiency, and conservation.
The Energy Policy (DoE, 2015)	2015	The Lesotho Energy Policy aims to make energy universally accessible and affordable in a sustainable way, while minimizing environmental impacts. Its main goal is to provide universal and sustainable access to affordable and reliable modern energy to support economic, political, and social development. The policy statements for the Bioenergy, Renewable Energies and Energy Efficiency in Electricity subsectors emphasize the government's commitment to ensuring a sustainable supply of bioenergy resources, improving access to renewable energy services and technologies, and promoting energy-efficient practices and equipment across all sectors of the economy. <b>The policy's priority areas include:</b> <ul style="list-style-type: none"> <li>• Enhancing access to reliable, affordable, and modern energy services</li> <li>• Managing the environmental impacts of energy exploitation and consumption</li> <li>• Promoting the use of renewable and alternative energy sources</li> </ul>
National Climate Change Policy and Implementation Strategy (Lesotho, 2017b)	2017	The National Climate Change Policy and Implementation Strategy is a framework that outlines provisions for addressing climate change issues, understanding the threats posed by climate change, and implementing actions to mitigate potential impacts. This policy and strategy aim to guide national response measures to tackle climate change effectively. It also offers guidance on integrating climate change considerations into national development planning at various levels, including national, district and local levels, to ensure successful implementation. Additionally, the strategy emphasizes adaptation and mitigation policies in key sectors of the country.

Framework for Private Sector Investment in Electricity Generation, Distribution and Supply (DoE, 2023)	November 2023	The framework was created to support the growth of Lesotho's power sector by assisting independent power producers, especially those focusing on renewable energy. It provides guidance for private investors interested in the country's electricity generation, distribution, and supply industries, highlighting opportunities and challenges for collaboration. The framework aims to tackle economic, technical, and regulatory obstacles faced by renewable energy producers in Lesotho.
Third National Communication to the UNFCCC (LMS, 2017)	2021	Lesotho's mitigation options and measures in response to climate change, in line with the objectives and provisions of the UNFCCC, were assessed based on assumptions of GHG emissions projections from 2011 to 2030 following two scenarios: a business-as-usual scenario and a mitigation scenario based on specific actions in the key sectors of energy and transport, AFOLU and waste. The business-as-usual scenario in the energy and transport sector showed that the transport subcategory will be the largest and fastest-growing contributor of GHG emissions, followed by residential, manufacturing, and construction subcategories. In the mitigation scenario, it was projected that by 2030, the transport subcategory will dominate the total GHG emissions. In order to reduce the projected GHG emissions, one of the TNC recommendations is the wider use of solar energy for low-power electricity using photovoltaic systems.
United Nations Framework Convention on Climate Change	June 1992	Lesotho is Party to the UNFCCC, part of which requires that parties to the Convention do their part in a drive towards a low carbon development, through the mitigation of the emission of greenhouse gases (IPCC, 1992).
Electrification Master Plan (AETS Consortium, 2018)	2018	The Electrification and Master Plan of Lesotho aims to increase energy access and promote renewable energies in rural areas. The government's goal is to achieve 75% electricity access by 2030 through a mix of grid and off-grid solutions. The plan outlines connecting around 10 663 households to modern off-grid energy solutions and 379 units to mini-grids annually starting in 2018.

## 1.1.2 Action Plan for Efficient Cookstoves Technology

### 1.1.2.1 Introduction

More than half of the rural population in Lesotho, along with many schools and institutions, currently use traditional cooking methods that require large amounts of firewood. This results in high CO<sub>2</sub> emissions and health issues for cooks, particularly women who are often the primary cooks in households and spend significant time near stoves. Efficient cookstoves can reduce firewood consumption by 50-80%, leading to significant cost savings. Most locally available efficient cookstoves will have paid for themselves within 5 years. A single stove can save between 2.5 and 10 tonnes of CO<sub>2</sub> per year, helping to address the global climate crisis. These cookstoves also improve indoor air quality, reducing respiratory diseases linked to kitchen activities, and help combat unsustainable deforestation. Less than 50% of households in Lesotho have adopted clean cooking technologies and fuels due to the higher cost compared to traditional biomass, unreliable supply of clean energy technologies, lack of financing options for purchasing clean or improved cookstoves, and insufficient gender awareness in promoting clean cooking. (*Tracking SDG7: The Energy Progress Report, 2023 – Analysis - IEA, 2023*), (*Share of the population with access to clean fuels for cooking, 2024*).

Improved cookstoves are currently being emphasized for their various advantages. These benefits encompass enhanced health and time efficiency for households, forest conservation and related ecosystem services, decreased emissions that contribute to global climate change, and the empowerment of women along with cost savings for consumers. Despite the many advantages of improved cookstove initiatives, progress in achieving widespread adoption and usage has been sluggish.

Highly efficient cookstoves are not widely manufactured in Lesotho currently, but there are two organizations actively working to promote and implement them. The ACE One Ultra-Clean Biomass Cookstove, manufactured by African Clean Energy (ACE), and the SAVE80 Cookstoves, locally assembled by Solar Lights Ltd (Pty), are the most popular and highest efficiency cookstove available on the market. The SAVE80 Cookstoves are made in Germany and then assembled in Lesotho by Solar Lights (Pty) Ltd. According to the manufacturer, each cookstove can save between 2.5 and 2.8 tCO<sub>2</sub> per year, which is more than the emissions produced by a mid-size car driven 10 000 kilometres per year<sup>9,10</sup>. The SAVE80 stove is designed to use 80% less wood than traditional cooking methods, leading to an 80% reduction in CO<sub>2</sub> emissions. This level of efficiency translates to an average annual CO<sub>2</sub> reduction of about 2.8 tonnes per household when used for daily cooking and water boiling. Over a 20-year lifespan, the SAVE80 stove has the potential to save over save more than 50 tonnes of CO<sub>2</sub> emissions.

ACE-1 Cookstoves, manufactured by ACE in Lesotho, offer a clean alternative for cooking and can utilize a variety of solid biomass fuels. The ACE-1 stove utilizes gasifier technology to ensure efficient fuel combustion, resulting in lower emissions and decreased fuel usage compared to traditional stoves. Users can achieve significant fuel savings of 50 - 85% when cooking with the ACE-1 stove, leading to cost savings, reduced time spent gathering fuel and contributing to forest conservation efforts in Lesotho. The ACE-1 stove operates without producing smoke, reducing CO<sub>2</sub> and PM<sub>2.5</sub> emissions by up to 95% compared to open fires. It is estimated that one ACE-1 stove can reduce 10 tCO<sub>2</sub> emissions over an 8-year period. These benefits, including improved health outcomes, fuel and time savings, and reduced gender disparities, contribute to enhancing livelihoods and protecting forests.

The Government of Lesotho, through its research and development centre, ATS, is also working on developing affordable and efficient cook stoves that can also be used for space heating. ATS is also focused on developing other energy-efficient household technologies, such as solar fruit and vegetable driers, commercial-scale solar box cookers, and solar hot water collectors.

**In summary, the implementation of improved cookstoves offers several benefits, including:**

- Reduced demand for biomass, leading to a decrease in deforestation associated with firewood consumption.
- Improved air quality achieved through the reduction of emissions of soot particles (black carbon) and smoke.
- Reduction in GHG emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) compared to traditional cooking methods.
- Decrease in respiratory and eye diseases primarily due to lower levels of fine particles, smoke emissions, and other harmful pollutants.
- Creation of new job opportunities in the production, sales, marketing and distribution of efficient stoves.
- With faster cooking times and reduced fuel requirements, efficient cookstoves could save women valuable time spent on cooking tasks.
- Decrease in safety hazards, as traditional cooking methods involving open fires or basic stoves can pose risks, especially for women and children who may experience burns or accidents.

The opportunity available is the Government of Lesotho's plan to promote the uptake and sustained use of clean, modern cooking technologies through the development and enforcement of a comprehensive legal, regulatory and commercial framework for the clean cooking sector; promotion

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<sup>9</sup> [https://www.atmosfair.de/en/climate-protection-projects/energy\\_efficiency/lesotho/](https://www.atmosfair.de/en/climate-protection-projects/energy_efficiency/lesotho/)

<sup>10</sup> <https://cdm.unfccc.int/Projects/DB/RWTUV1323354971.78/view?cp=2>

of local manufacturing of clean cooking equipment, fuels and accessories; provision of fiscal incentives e.g. subsidies, loans and tax incentives to the clean cooking sector to encourage private sector involvement; supporting the growth of women as promoters, suppliers, leaders and manufactures of clean cooking equipment and resources. Financing schemes for clean cooking fuels and equipment will be promoted through loans from targeted microfinance institutions, banks, SACCOs or other agencies. It is also anticipated that National Standards, Labelling, and Certification Programs will also be established and implemented for the clean cooking sector.

**Support for technology prioritisation:** Several reasons were put forward by stakeholders for selecting this technology. The main ones being outlined below and in the next section.

**Technology maturity:** The technology was seen to be mature and sustainable.

**Cost:** The cost of efficient cookstoves is decreasing, making them more affordable for households and institutions even without subsidies. To determine the financial impact, a comparison can be made between current household energy expenses and the potential savings with a clean cookstove. Prices may vary depending on the vendor. In Lesotho, some private sector companies offer interest-free financing to households for purchasing a clean cookstove. On average, a household of 4 in off-grid areas spends around LSL 514 per month on cooking and heating. The cost of efficient cookstoves varies based on design features and materials used. Currently, the price of a stainless steel SAVE80 Cookstove is LSL 1 500 (USD 80) with a lifespan of 20 years, reducing the annualized capital significantly. The accompanying stainless pot and cast-iron pot are each sold for LSL 500 (USD 25). The Wonder-box is priced at LSL 500 (USD 25) each and needs to be imported.

The ACE-1 Stove costs LSL 1 750 (USD 90) depending on the capacity, with free service and maintenance included (terms and conditions will apply). A down payment of LSL 250 is required for the stove, with the remaining amount collected in monthly payments of LSL 120 over 12-15 months through a micro-loan. Customers can use the energy savings from the product to repay the investment. The ACE stove also comes with a small solar PV panel, LED light, and charging outlet, allowing households to reduce energy expenses. The payment plan helps rural households with cash flow issues in affording the product.

### **1.1.2.2 Ambition for the TAP**

The ambition for this technology is consistent with GoL's ambitious plan, as outlined in Lesotho's Revised NDC 2024, to scale up access and adoption of clean and efficient cooking and heating technologies to rural and peri-urban communities to reduce their dependence on traditional biomass fuels. By 2030, the aim is to distribute 30 800 efficient fuel stoves to households in both rural and peri-urban areas currently using inefficient traditional biomass fires. The initiative is also expected to expand to include schools, clinics, and similar institutions in need. The primary beneficiaries will be rural community councils in each of the 10 districts of the country. The aim is to help these communities transition away from kerosene and firewood, which pose health and safety risks, improving their living conditions and creating educational opportunities. This initiative is anticipated to generate over 1 000 new jobs for both men and women in these regions combined. Furthermore, it is anticipated that neighbouring community councils will also adopt clean efficient cookstoves, leading to wider adoption of the technology, potentially lowering prices, promoting socio-economic development, and reducing the consumption of firewood and fossil fuels. On average each energy-efficient cookstove reduces CO<sub>2</sub> emissions by 2.85 tonnes annually compared to traditional open-fire cooking<sup>11</sup>.

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<sup>11</sup> <https://www.green.earth/blog/cookstoves-for-carbon-reduction>

Economic benefits	<ul style="list-style-type: none"> <li>• <b>Time Savings:</b> Inefficient cooking methods require significant time and effort for fuel collection</li> <li>• <b>Income Generation Opportunities:</b> Adoption and promotion of efficient cookstoves can create income generation opportunities within local communities: This includes opportunities for stove manufacturing, distribution, sales, and maintenance.</li> <li>• Savings on cooking fuel by households: <i>An average rural household of 4 typically spends an average of USD 30 per month on cooking and water heating</i></li> </ul>
Climate Change Mitigation Benefits	<ul style="list-style-type: none"> <li>• <b>Reduced deforestation</b> given that households use less firewood for more cooking: This reduction leads to direct cost savings for households, as they spend less money on purchasing or collecting firewood, or other biomass fuels.</li> <li>• <b>30 800 Efficient Cookstoves:</b> <i>Reduced GHG emissions of 87 780 tCO<sub>2e</sub> per annum</i></li> </ul>
Mitigation and Adaptation co-benefits	<ul style="list-style-type: none"> <li>• <b>Mitigation Co-benefits:</b> Reduced GHG Emissions; Improved Air Quality; Preservation of Forests; Energy Efficiency</li> <li>• <b>Adaptation Co-benefits:</b> Health Benefits; Time and Labour Savings; Fuel Diversity and Security;</li> </ul>

**Gender issues:** It is anticipated that gender considerations will be integrated into the Technology Action Plan (TAP) for efficient cookstove technology in Lesotho by:

- Ensuring that women, particularly those from low-income households, have access to affordable and accessible efficient cookstoves through subsidies, microfinance schemes, or other financial incentives.
- Requiring local manufacturers and dealers to provide cookstoves with safety features to mitigate risks, especially for women and children who are most susceptible to burns and injuries while cooking.
- Implementing gender-sensitive awareness campaigns to educate both men and women on the health, economic, and environmental benefits of efficient cookstoves, while also addressing cultural norms and barriers that may hinder adoption.
- Involving women in decision-making processes concerning the design, distribution, and adoption of efficient cookstoves.
- Providing training programs specifically for women to equip them with the skills and knowledge necessary for stove maintenance, repair, and entrepreneurship.

### 1.1.2.3 Actions and activities selected for inclusion in the TAP

This section provides a discussion of the actions and activities that have been selected for inclusion in the TAP for efficient cookstoves.

**Summary of barriers and measures to overcome barriers:** The main barriers to technology deployment appear to be the high cost of the technology and low awareness of its advantages. Even households and institutions that can afford the technology may not be aware of its benefits. The Table 1.2 below provides a summary of the main challenges and solutions associated with the uptake and dissemination of efficient cookstoves as detailed in the Barrier Analysis and Enabling Framework report. The barriers that were assessed were categorized into two groups: (1) economic and financial barriers and (2) non-financial barriers, which were further subcategorised into institutional, regulatory, social, and technical barriers. Some of these measures were developed as actions.

**Table 1.2: Selected barriers and their measures for efficient cookstoves technology**

Category	Identified Barriers	Measures to overcome barriers
Economic and Financial	High upfront cost for efficient cookstoves and difficulty in accessing finance	<ul style="list-style-type: none"> <li>• Develop and implement innovative financing mechanisms that support the acquisition of efficient stoves, such as subsidies, revolving funds, etc.</li> <li>• Develop financial models that consider both the affordability and willingness to pay for efficient cookstoves.</li> </ul>

		<ul style="list-style-type: none"> <li>• Arrange financial support or assistance to poor rural households at zero or low interest rates with acceptable loan duration for them to acquire efficient stove,</li> <li>• Emphasize market promotion over technology donation to ensure that beneficiaries appreciate the value of the technology</li> <li>• Capitalize the Energy Fund and make it operational to provide financial support, capital subsidies, and production-based subsidies to investors, suppliers, dealers and consumers.</li> </ul>
Technical	Low-quality and substandard equipment and design	<ul style="list-style-type: none"> <li>• Establish guidelines and regulations for biomass cooking technologies,</li> <li>• Establish training and accreditation centres to educate and certify individuals for the renewable energy industry.</li> </ul>
Weak legal, regulatory and institutional framework	Inadequate institutional framework	<ul style="list-style-type: none"> <li>• Strengthen enforcement of quality standards.</li> <li>• Strengthen the capacity of the private sector for self-regulation under the relevant umbrella associations</li> <li>• Create an enabling environment for private sector initiatives</li> </ul>
Information and awareness	Inadequate and limited information sharing and public awareness about the technology	<ul style="list-style-type: none"> <li>• Enhance information dissemination through various channels such as print, electronic, and social media,</li> <li>• Conduct seminars, workshops, and conferences to educate the public.</li> <li>• Build local capacity and promote community engagement to maximize the positive socio-economic impact of renewable energy and raise awareness about its benefits among end users.</li> </ul>
Cultural, social and gender	Low participation of women in the sector.	<ul style="list-style-type: none"> <li>• Implement policies, initiatives and incentives to promote gender diversity in the energy industry</li> <li>• Set up scholarship program to incentivize the enrolment of women for gender mainstreaming</li> </ul>

It is important to note that the barriers outlined in this document may not align exactly with those identified in the BAEF report. This discrepancy is due to the differing objectives and scopes of the two reports. The BAEF report aims to identify barriers to technology deployment across various sectors, while the TAP focuses on actionable strategies and specific technologies for implementation. When transitioning from the BAEF report to the TAP, a selection process is undertaken to prioritize the most critical barriers for immediate action or those that closely align with the TAP's goals. This selection process involves consultations with stakeholders to ensure that the barriers addressed in the TAP are relevant and actionable within ongoing projects and initiatives. The TAP has also updated barriers to reflect the current technological landscape, policy environment, and socio-economic conditions, resulting in some differences from the original BAEF findings. Despite these discrepancies, the BAEF report remains the primary and more comprehensive source for understanding the full range of barriers and enabling measures in Lesotho's energy sector. For a more detailed exploration of the barriers and enabling frameworks, readers are encouraged to refer directly to the BAEF report.

### **Actions selected for inclusion in the TAP for Efficient Cookstoves**

This section provides a list of the measures selected as actions, along with narrative descriptions, that will be included in the TAP to increase the diffusion and penetration of efficient cookstove applications in Lesotho. Following an assessment process carried out by the consultant using Logical Problem Analysis, as well as consultations with stakeholders in May 20.24, the most relevant actions corresponding to the measures described above have been selected and reviewed:

**Action 1: Establish a dedicated unit to coordinate and oversee the implementation of the TAP** initiatives is essential for the successful rollout of the efficient cookstove technology in the country. This unit will be responsible for executing all actions and projects outlined in the TAP, providing technical coordination and project management. Additionally, it could be tasked with developing a comprehensive national strategy focused on technology adoption and creating a market value chain. It

is crucial that the unit is staffed with skilled personnel capable of developing terms of references (TORs) and scopes of work, and effectively carrying out the necessary actions and activities of the proposed projects.

- Given that several organizations have already carried out the same project, often with the same beneficiaries, it is important to have an organization that coordinates the activities to make the achievement of the project's goals more efficient. The Ministry of Environment and Forestry is suggested to take the lead in this initiative.

**Action 2: Promote and encourage the market for efficient cookstoves, rather than relying solely on technology donations:** To ensure that beneficiaries appreciate the value of the technology, stakeholders strongly recommend offering it through co-financing options for low-income families. Instead of blanket technology donations, targeted subsidies and incentives can be provided to make efficient cookstoves more affordable for low-income households.

- This strategy ensures that resources are allocated to where they are most needed while also fostering market development. Additionally, it should be accessible to the general public who are interested in obtaining it but are not part of the designated beneficiaries. By promoting the market for efficient cookstoves rather than solely relying on technology donations, a sustainable, economically viable, consumer-owned, and scalable solution can be achieved to address energy poverty, improve public health, and promote environmental sustainability. This approach is in line with sustainable development principles and empowers individuals and communities to chart their own paths to success. It promotes entrepreneurship, innovation, and collaboration, laying the foundation for sustainable economic growth and social advancement.

**Action 3: Enhance access to financing** through innovative and affordable financial strategies or business models, establishing and implementing financial incentives for manufacturers that produce efficient cookstoves. Affordability has been highlighted as a major challenge for households, schools and institutions, as well as for manufacturers of these stoves. Many rural households and institutions require financial assistance to purchase efficient cookstoves, while manufacturers seek innovative payment options for their customers to enhance affordability and ensure timely repayment. The Energy Fund should be operationalised to provide loans to local manufacturers and individuals interested in acquiring efficient cookstove technology. This will help overcome a significant barrier to the adoption and deployment of efficient cookstove technology in both rural and urban areas where individuals have limited saving potential and no access to conventional energy technologies.

**Action 4: Increase awareness and knowledge** of efficient cookstoves by intensifying the dissemination of information, public education, and awareness campaigns for various stakeholders through various channels like print and electronic media, social media, seminars, workshops, conferences, and community engagements. This approach will help expand entrepreneurial initiatives, encourage greater uptake of the technology, and provide users with essential information, such as efficient cookstove equipment costs and performance metrics.

**Action 5: Establish standards and strengthen institutional capacity:** Enhanced adoption of efficient cookstoves requires strong and well-coordinated institutions, especially for policy development and implementation, regulatory oversight, market development, monitoring and evaluation, as well as coordination and collaboration.

**Action 6: Register and maintain beneficiaries' information:** It is important to maintain a comprehensive database of beneficiaries to track the distribution of stoves and effectively monitor the performance and impact of the technology. Keeping a record of beneficiaries is a fundamental component of gender-responsive programming for clean efficient cookstoves as it allows program



managers to monitor progress, ensure transparency, tailor interventions to women, empower women through visibility, advocate for resources, and continuously improve program effectiveness.

### *Activities identified for implementation of selected actions*

For each of the actions described in the previous section, specific activities have been identified that must be carried out to comply with the measure. This section summarizes the identified actions into more specific activities. These activities are presented in Table 1.3 below.

**Table 1.3: Activities identified for implementing selected actions for efficient cookstove**

Action	Activity
<b>Action 1: Establish dedicated unit to coordinate</b> and oversee implementation of TAP initiatives within either the Ministry of Environment and Forestry (MEF) or the Ministry of Energy (ME)	<ul style="list-style-type: none"> <li>Recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP.</li> <li>Establish and equip the office of the Project Implementation Unit.</li> </ul>
<b>Action 2: Promote and encourage the market</b> for efficient cookstoves, rather than relying solely on technology donations.	<ul style="list-style-type: none"> <li>ME and MEF to coordinate with stove manufacturers and suppliers to market their technology for sale to the public.</li> </ul>
<b>Action 3: Enhance access to financing options</b> for efficient cookstoves by providing financial incentives, financial assistance, microfinance and payment options, collaborating with private sector entities to leverage their expertise and resources in developing innovative financing solutions.	<ul style="list-style-type: none"> <li>MEF and ME should work with local manufacturers to provide innovative and affordable financial plans or business models for the purchase of efficient cookstoves targeted at people in rural and urban areas.</li> <li>ME and MFDP should expedite the establishment of the Energy Fund and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire efficient cookstoves.</li> <li>MFDP and MEF should hold consultative meetings with financial institutions to encourage them to lower interest rates and extend the duration of loans for the acquisition of efficient cookstoves, and identify potential partners willing to support the efficient stove technology initiatives</li> <li>ME and MEF to engage a consultant to evaluate the technology costs and establish an appropriate co-financing or subsidy rate for households with limited income.</li> </ul>
<b>Action 4: Increased awareness and knowledge on efficient cookstoves through targeted awareness campaigns</b> using various media platforms to enhance adoption and knowledge among stakeholders.	<ul style="list-style-type: none"> <li>To ensure the success of the awareness campaign, ME needs to engage a public relations team to conduct a study of the target audience. This will help in identifying the appropriate media channels and messaging required for an effective campaign. <ul style="list-style-type: none"> <li><i>During the development phase, a focus group session may be conducted to assess the efficacy of the materials being generated. The campaign will subsequently be implemented according to the plan and assessed to gauge its effectiveness.</i></li> </ul> </li> <li>MEF and ME need to enhance the dissemination of adequate information, public education, and awareness campaigns on efficient cookstoves for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements.</li> <li>MEF and ME should set up information hubs or centres in each district to enhance awareness about the costs, benefits, and performance of efficient cookstoves for local communities, financial institutions, cooperatives, and entrepreneurs.</li> </ul>
<b>Action 5: Establish standards and Strengthen Institutional capacity:</b> Enhanced adoption of efficient cookstoves indeed hinges on the presence of strong and well-coordinated institutions.	<ul style="list-style-type: none"> <li>MTI and ME should prioritize the creation and adoption of relevant standards for cookstoves and the enforcement of quality control protocols</li> <li>MTI and ME should focus on the development of applicable standards for cookstoves and the implementation of quality control measures</li> <li>MEF, ME and Technical and Vocational Education and Training institutes should offer regular and specialized technical training on efficient cookstove installation, operation, management, maintenance, and business development to enhance the skills of personnel, such as technicians and private entrepreneurs, with an emphasis gender inclusivity.</li> </ul>

	<ul style="list-style-type: none"> <li>• MEF and ME should enhance the capabilities of personnel in financial institutions, regulatory agencies, and policy-making institutions.</li> </ul>
<p><b>Action 6: Register and maintain beneficiary records:</b> Detailed record of beneficiaries should be kept in order to track the stoves that have been distributed and to efficiently follow up on the management and efficiency of the technology.</p>	<ul style="list-style-type: none"> <li>• MEF and ME should engage a consultant to compile the Project Inventory of existing studies on efficient stove, and to develop standardized data collection tools and protocols to capture relevant information about beneficiaries, including their demographics, household characteristics, socioeconomic status, and cooking practices. It is important to ensure that these tools are gender-sensitive and culturally appropriate to facilitate accurate and comprehensive data collection.</li> <li>• Establish robust data management systems to securely store, organize, and analyse beneficiary information.</li> <li>• Develop a digital platform for sharing these studies. Encourage the target audience to use the tool and designate a specific individual to upload studies, research, and reports on efficient cookstoves to the platform. This person will also be responsible for maintaining the website.</li> </ul>

**Actions to be implemented as Project Ideas:** All six actions are essential for achieving the ambitions of the Efficient Cookstoves TAP. However, the barrier analysis and consultations on the enabling framework underscore the significance of actions 3, 4 and 6. These actions are crucial for the success of the TAP and will be implemented as Project Ideas (PIs) to propel advancements in the development of the Efficient Cookstoves TAP.

**Action 3: Improving access to financing** via innovative and affordable financial strategies or business models and instituting financial incentives for efficient cookstove manufacturers. During the barrier analysis and enabling framework discussions, affordability emerged as a significant barrier for households, schools and institutions, as well as manufacturers of efficient cookstoves. Stakeholders proposed the development of financial incentives as a key measure in overcoming this barrier. Key activities under this action will be considered for the TAP.

**Action 4: Increase awareness and knowledge** of efficient cookstoves by intensifying the dissemination of information, public education, and awareness campaigns for various stakeholders through various channels like print and electronic media, social media, seminars, workshops, conferences, and community engagements. This approach will help expand entrepreneurial initiatives, encourage greater uptake of the technology, and provide users with essential information, such as efficient cookstove equipment costs and performance metrics.

**Action 6: Registering and maintaining beneficiaries’ information:** It is important to maintain a comprehensive database of beneficiaries to track the distribution of stoves and effectively monitor the performance and impact of the technology. Keeping a record of beneficiaries is a fundamental component of gender-responsive programming for clean efficient cookstoves as it allows program managers to monitor progress, ensure transparency, tailor interventions to women, empower women through visibility, advocate for resources, and continuously improve program effectiveness.

**Gender issues:**

Activities within the TAP that particularly concentrate on enhancing awareness and knowledge, maintaining and updating beneficiary records, and facilitating increased access to finance for clean, efficient cookstoves will significantly contribute to achieving gender outcomes as outlined below:

- **Enhancing access to financing options:**
  - a) **Microfinance Options:** Partnering with microfinance institutions to develop affordable financing options tailored to women, including low-interest loans or flexible repayment plans.

These initiatives will enable women, particularly those from low-income households, to overcome financial barriers and afford clean cookstoves.

- b) **Subsidies and Incentives:** Advocating for government subsidies or incentives to make clean cookstoves more affordable for women. This will involve lobbying policymakers to allocate funds specifically for women's access to clean energy technologies, ensuring that financial support reaches those who need it most.
- c) **Community-Based Financing Models:** Exploring community-based financing models such as revolving loan funds or savings groups that empower women to pool their resources and collectively invest in clean cookstoves. These models promote solidarity and mutual support among women while increasing their access to financing.
- **Increase Awareness and Knowledge:**
  - a) **Targeted Messaging:** Tailoring awareness campaigns to reach women specifically, highlighting the benefits of clean and efficient cookstoves in terms of health, time savings and environmental impact. Using channels such as community gatherings, women's groups, and social media platforms that are accessible to women.
  - b) **Training and Education:** Offering training sessions and educational programs focused on women, providing them with the knowledge and skills needed to understand the benefits of clean cookstoves, how to use them effectively, and how to maintain them. This will empower women to make informed decisions about adopting these technologies.
  - c) **Engaging Community Leaders and Influencers:** Involving influential women within the community, such as local leaders, teachers, or healthcare workers, to act as advocates for clean cookstoves. Their endorsement will help build trust and credibility around the technology, encouraging more women to adopt it.
- **Registering and maintaining beneficiaries' records:**
  - a) **Gender-Disaggregated Data Collection:** By maintaining records of beneficiaries, it's possible to collect gender-disaggregated data, which provides insights into the participation and impact of clean cookstove interventions on women and men separately. This data allows for a deeper understanding of the specific needs, preferences, and challenges faced by women in adopting clean cookstoves.
  - b) **Monitoring Gender Equity:** Tracking the distribution and utilization of clean cookstoves among women helps monitor progress towards gender equity goals. It allows program implementers to assess whether interventions are reaching women in proportion to their needs and to identify any disparities or barriers that may exist.
  - c) **Tailoring Interventions to Women's Needs:** Analysing beneficiary data can reveal specific trends and patterns related to women's participation and outcomes. This information can inform the design and implementation of tailored interventions that address the unique preferences, constraints, and priorities of women, thereby increasing the effectiveness and impact of the program.
  - d) **Advocacy and Resource Allocation:** Data on the number of women benefiting from clean cookstove interventions can serve as evidence for advocacy efforts aimed at securing additional resources and support for gender-responsive programming. It demonstrates the importance of investing in initiatives that promote women's empowerment and contribute to achieving broader gender equality objectives.

### 1.1.2.4 Stakeholders and timeline for implementation of TAP

#### Overview of Stakeholders for the implementation of the TAP:

The successful implementation of the TAP requires the full cooperation of several key stakeholders. Given that the TNA project falls under the UNFCCC, and the Focal Point resides within the Ministry of Environment and Forestry, this ministry acts as its advocate. The Ministry of Energy will be responsible for implementing the technology on the ground, with other stakeholders also playing important roles. Table 1.4 below outlines the key stakeholders and their respective roles.

**Table 1.4: Roles of stakeholders involved in the efficient institutional cookstoves technology**

Stakeholder	Action	Role
Ministry of Environment and Forestry (MEF)	1, 2, 3, 4, 5 and 6	<ul style="list-style-type: none"> <li>• Proponent.</li> <li>• The Ministry is the focal point for GEF and should explore other sources of funding to sustain the project.</li> <li>• Should organize key stakeholders' workshop to communicate about the project and the TAP in particular to get stakeholders buy-in.</li> <li>• Engage in providing advice to the MFDP during the formulation of the financial incentives policy.</li> <li>• LMS, a focal point of the UNFCCC under the MEF, will lead and provide information to support the development of the carbon financing market.</li> </ul>
Ministry of Energy (ME)	2, 3, 4, 5, and 6	<ul style="list-style-type: none"> <li>• Promotes renewable energy Technologies</li> <li>• Make policy amendments to Government to subsidize interest rates and set up a revolving fund</li> <li>• Manage the Renewable Energy Fund</li> </ul>
Ministry of Finance and Development Planning (MFDP)	3	<ul style="list-style-type: none"> <li>• Develop and implement a policy on clean cooking financial incentives to provide subsidies for interest rates on clean cooking technologies.</li> <li>• Responsible for fiscal policies including incentives and subsidies</li> <li>• Negotiate loans for funding renewable energy project</li> </ul>
Ministry of Trade and Industry (MTI)	5	Standards and Quality Assurance Department (SQAS) of the Ministry of Trade and Industry has been the National Standards Body for Lesotho and an ISO subscriber member since 1 January 2000 and is the focal point for Standards and Quality issues. The legal framework to provide for establishment of standards, certification and related issues is still in the pipeline. Through SQAS Department, develop and enforce quality standards for efficient cook stoves: Currently, no <i>national standards have been established, and the department's main focus is on raising awareness</i>
Ministry of Information, Communications, Science, Technology and Innovation (MICSTI)	4	Together with the ME, sensitize the public on the benefits of adopting clean cooking technology
Technical and Vocational Education and Training Institutes (TVET)	5	Provide technical training courses in efficient cookstove installation, operation, management, maintenance, and business development.
Development partners and funds: WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, UNFCCC, GEF, GCF	1, 2, 3, 4, 5 and 6	Provide technical and financial support for diffusion of efficient cookstove technology
Non-Governmental Organizations (NGOs)	2, 3, 4 and 6	Focus on advocacy, capacity building, funding, and monitoring
Women's Groups	2 and 4	Engage in community outreach, training, and economic empowerment.
Private Sector	2, 3 and 6	Manages production, innovation, distribution, and partnership development

***Scheduling and sequencing of specific activities:*** The timeline for planning and implementing efficient cookstoves TAP's actions and activities to establish a robust policy framework for deploying prioritized energy sector technologies spans 6 years (2024 to 2030). This timeframe aligns with the targets set by Sustainable Development Goal 7, Lesotho's Revised Nationally Determined Contributions, and National Strategic Development Plan II (2023/24 – 2027/2028) (extension), which are key national policies addressing development priorities and climate change mitigation to achieve the country's energy sector objectives in line with Sustainable Development Goal 7.

Table 1.5 below outlines the sequence and schedule of specific activities and responsibilities.

**Table 1.5: Sequence and schedule of specific activities and responsibilities.**

Action	Activity	Responsibility Body	Years					
			1	2	3	4	5	6
<b>Action 1: Establishing a dedicated unit</b> to coordinate and oversee the implementation of the TAP initiatives is essential for the successful rollout of the efficient cookstove technology in the country.	<ul style="list-style-type: none"> <li>Recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP.</li> <li>Establish and equip the office of the Project Implementation Unit.</li> </ul>	MEF and ME						
<b>Action 2: Promoting and encouraging the market</b> for efficient cookstoves, rather than relying solely on technology donations:	<ul style="list-style-type: none"> <li>Engage a consultant to evaluate the technology costs and establish an appropriate co-financing or subsidy rate for households with limited income.</li> <li>Coordinate with stove manufacturers and suppliers to market their technology for sale to the public</li> </ul>	ME and MEF						
<b>Action 3: Improving access to financing</b> through innovative and affordable financial strategies or business models, establishing and implementing financial incentives for manufacturers that produce efficient cookstoves.	<ul style="list-style-type: none"> <li>Collaborate with manufacturers to provide innovative and affordable financial plans or business models for the purchase of efficient cookstoves targeted at people in rural and urban areas.</li> <li>Expedite the establishment of the Energy Fund and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire efficient cookstoves.</li> <li>Hold consultative meetings with financial institutions to encourage them to lower interest rates and extend the duration of loans for the acquisition of efficient cookstoves and identify potential partners willing to support the efficient stove technology initiatives.</li> </ul>	ME, MEF and MFDP						
<b>Action 4: Increase awareness and knowledge</b> of efficient cookstoves by intensifying the dissemination of information, public education, and awareness campaigns for various stakeholders	<ul style="list-style-type: none"> <li>Engage a public relations firm to conduct a study of the target audience to assist in identifying the appropriate media channels and messaging required for an effective campaign.</li> <li>Enhance the dissemination of adequate information, public education, and awareness campaigns on efficient cookstoves for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements.</li> <li>Set up information hubs or centres in each district to enhance awareness about the costs, benefits and performance of efficient cookstoves for local communities, financial institutions, cooperatives, and entrepreneurs.</li> </ul>	ME and MEF						
<b>Action 5: Establishing standards and strengthening institutional capacity</b>	<ul style="list-style-type: none"> <li>Focus on the Development and domestication of applicable standards for cookstoves and the implementation of quality control measures.</li> <li>Offer regular and specialized technical training on efficient cookstove installation, operation, management, maintenance, and business development to enhance the skills of personnel, such as technicians and private entrepreneurs, with an emphasis gender inclusivity.</li> <li>Enhance the capabilities of personnel in financial institutions, regulatory agencies, and policy-making institutions.</li> </ul>	MIT, ME, MEF and TVET						
<b>Action 6: Registering and maintaining beneficiaries' information:</b>	<ul style="list-style-type: none"> <li>Engage a consultant to compile the Project Inventory of existing studies on efficient stoves, and to develop standardized data collection tools and protocols to capture relevant information about beneficiaries, including their demographics, household characteristics,</li> </ul>	ME and MEF						

	<p>socioeconomic status and cooking practices. <i>It is important to ensure that these tools are gender-sensitive and culturally appropriate to facilitate accurate and comprehensive data collection.</i></p> <ul style="list-style-type: none"> <li>• Implement strong data management systems to securely store, organize, and analyse beneficiary information.</li> <li>• Create a digital platform for sharing these studies and promote its use among the target audience. Assign a dedicated individual to upload studies, research, and reports on efficient cookstoves to the platform and maintain the website.</li> </ul>							
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**Gender issues:** When implementing efficient cookstoves TAP, it will be essential to take into account gender dynamics among stakeholders and assess how actions and activities impact individuals of different genders.

- **Stakeholder Mapping:** Beginning by identifying all stakeholders involved in the efficient cookstoves programme and ensure that both men and women are represented across various levels of decision-making and implementation.
- **Gender-sensitive Needs Assessment:** Conducting a comprehensive needs assessment that considers the specific energy needs and usage patterns of both men and women in the target communities.
- **Tailored Design and Distribution:** For example, stove designs should be ergonomic and user-friendly for women, considering factors like stove height and ease of fuel collection, and distributing cookstoves through channels that reach both genders equally, ensuring that women have access to these technologies.
- **Training and Capacity Building:** Providing gender-sensitive training and capacity-building programs to ensure that both men and women are equipped with the skills to use and maintain efficient cookstoves.
- **Income Generation Opportunities:** Exploring income-generating activities related to efficient cookstoves that can empower women economically.
- **Monitoring and Evaluation:** Establishing gender-sensitive indicators and mechanisms for monitoring and evaluating the impact of the efficient cookstoves program.
- **Empowerment and Participation:** Creating opportunities for meaningful participation and leadership of women in decision-making processes related to efficient cookstoves and ensuring that women have a voice in project planning, implementation, and evaluation, and that their perspectives are valued and incorporated into program activities.

#### **1.1.2.5 Estimation of resources needed for action and activities**

**Estimation of capacity building needs:** To execute the defined activities for the technology's implementation, it is essential to have access to both human and material resources. In collaboration with stakeholders, the capacity development needs for efficient implementation of the TAP's actions and activities, as well as strengthening of the enabling framework for energy sector technologies, were identified. There is a need to build capacity in sourcing international funds as well as training and accrediting local personnel to ensure accelerated diffusion of the technology in the country.

##### **Human Resources:**

- Social science professionals with statistical knowledge for various studies.
- Trained facilitators to promote and support project initiatives.
- Finance and fund management specialists.
- Experts in credit and banking.
- Skilled in teamwork, budget management, and project management.

##### **Material Resources:**

- Financial support for organizing workshops, training sessions, and socialization activities.
- Vehicles for transporting professionals to facilitate nationwide socialization and capacity building.



- Funding for conducting workshops, training sessions, and socialization activities.

**Estimations of costs of actions and activities:** The cost estimates for the implementation of TAP's actions and activities were developed in collaboration with stakeholders, considering the expenses related to similar activities within the country. Table 1.6 outlines the estimated costs in USD for each specific action and activity over the planned period. The overall estimated cost for the implementation of Efficient Cookstoves including Gender-Responsive Capacity Building stands at USD 439 000.

**Table 1.6: Estimated Costs for Developing Efficient Cookstove Initiatives**

Actions	Activities to be supported	Estimated Costs (USD)
Establish a Project Implementation Unit (PIU) at the MEF or ME to oversee and lead the implementation of the TAP	Recruiting highly skilled personnel to develop a project implementation plan for the rollout of the TAP	22 500
	Establishing and equipping the office of the PIU	15 000
Focusing on market promotion rather than relying on donating technology	Engaging a consultancy firm to conduct a cost analysis of the technology and determine a suitable co-financing or subsidy rate for families with low income	7 500
	Coordinating with cookstove manufacturers to promote their technology for sale to the public.	1 500
Enhancing access to financing options through innovative and affordable financial strategies	Coordinating with manufacturers to provide innovative and affordable financial plans or business models for the purchase of efficient cookstoves targeted at people in rural and urban areas.	22 500
	Coordinating with financial institutions to advocate for reduced interest rates and extended loan terms for the acquisition of efficient cookstoves, and identify potential partners willing to support efficient cookstove technology.	15 000
	Operationalizing the Energy Fund to support the various stakeholders in the value chain and offer loans at zero or low-interest rates, with reasonable repayment terms, to help impoverished households purchase efficient cookstoves.	22 500
Increasing awareness and knowledge on efficient cookstoves	Engage a public relations firm to conduct a study of the target audience to assist the team in identifying the appropriate media channels and messaging required for an effective campaign	37 500
	Intensifying the dissemination of adequate information through public education and awareness campaigns on efficient cookstoves for various stakeholders via print and electronic media, social media, seminars, workshops, conferences, and community engagements	10 000
	Establishing information hubs or centres in each district to increase and improve awareness about efficient cookstove equipment costs, benefits and performance for local communities, financial institutions, cooperatives, and entrepreneurs.	75 000
<i>Developing standards, Building and Strengthening Institutional capacity</i>	Development relevant standards for cookstoves, drawing on other countries and adapting it to Lesotho's unique context, as well as the enforcement of quality control measures.	45 000
	Providing periodic specialized technical training in efficient cookstove installation, operation, management, maintenance, and business development to enhance the skills of personnel, including technicians and private entrepreneurs, with a focus on gender inclusivity.	75 000
	Strengthening skills of staff in financial institutions, regulatory agencies and policy-making institutions.	45 000
Registering and maintaining beneficiaries' records	Engage a consultant to compile the Project Inventory of existing studies on efficient stoves, and to develop standardized data collection tools and protocols to capture relevant information about beneficiaries, including their demographics, household characteristics, socioeconomic status and cooking practices.	15 000
	Establishing robust data management systems to securely store, organize, and analyse beneficiary information.	15 000
	Designating a specific individual to upload studies, research, and reports on efficient cookstoves to the platform. This person will also be responsible for maintaining the website.	15 000
<b>Total</b>		<b>409 000</b>

**Gender Issues:** It will be essential to integrate gender-responsive approaches into capacity building for efficient cookstoves as part of the TAP implementation. This will ensure equitable access to resources, opportunities, and benefits across all genders, as detailed in Table 1.7 below:

**Table 1.7: Gender-Responsive Capacity Building**

	Activities to be support	Estimated Costs (USD)
Gender-Responsive Capacity Building:	<ul style="list-style-type: none"> <li>• Provide gender-sensitive training on efficient cookstoves, covering benefits, usage, and maintenance. Ensure materials and methods are inclusive for all participants, considering literacy, language, and caregiving duties.</li> </ul>	10 000
	<ul style="list-style-type: none"> <li>• Customize awareness campaigns to cater to the unique needs and preferences of various gender groups. Emphasize the health advantages, time efficiency, and financial opportunities linked to modern cookstoves. Showcase how these stoves can ease the cooking responsibilities, especially for women.</li> </ul>	10 000
	<ul style="list-style-type: none"> <li>• Offer hands-on training sessions for both men and women on using and maintaining cookstoves. Address gender-specific barriers like childcare responsibilities by providing childcare services or scheduling sessions at convenient times and locations.</li> </ul>	10 000

Conducting a gender analysis of budget lines and activities within the TAP implementation framework allows for the identification of opportunities to integrate gender equality considerations, ensuring that capacity-building efforts for efficient cookstoves are inclusive and meet the needs of all genders in Lesotho.

### 1.1.2.6 Management planning

**Risks and Contingency Planning:** Table 1.8 below summarizes the primary risks identified in the activities, along with the corresponding contingency plans to mitigate these risks, ensuring the successful implementation of the efficient cookstoves TAP.

**Table 1.8: Risk and contingency plan for the implementation of Efficient Cookstoves TAP**

Type of risk	Description	Contingency plan
Cost risk	The cost of activities may exceed the budgeted amount due to delays in implementing the TAP and securing donor funding.	Include an additional 15% of the total estimated cost as 'contingencies'; Government of Lesotho to utilize budgetary support to establish the implementation unit, fund the preparation of public awareness and promotional campaigns, and use donor funds for implementation.
Scheduling Risks	The schedule may be delayed or take longer to complete than expected if financial and human resources are not secured on time, and also due to delays in the delivery of equipment, contracts, and consultant non-performance.	To mitigate this risk, it is important to regularly monitor the project planning and implementation schedule with the participation of all stakeholders. Additionally, the schedules should include sufficient lead time for the delivery of imported equipment and early identification and management of critical path items.
Performance Risks	Delays in making decisions about incentives, subsidies, and implementation	Ensure there is robust high-level political and institutional acceptance and support from the Cabinet as well as key Ministries and agencies.
Information risk	Delay in providing information and lack of cooperation or collaboration among stakeholders.	Establish a project steering committee to bring together key ministries and institutions in the implementation process. Ensure that the project will be managed by professional managers with a proven track record using best management practices

**Next Steps:** Table 1.9 below summaries the **immediate requirements** and **critical steps** for the successful implementation of the Efficient Cookstoves TAP.

**Table 1.9: Summary of immediate requirements and critical steps for the implementation of Efficient Cookstoves TAP**

Immediate requirements	Critical steps
<ul style="list-style-type: none"> <li>• MEF, along with key stakeholders, must incorporate this TAP into the country's NDCs and NAMAs. The project should be recognized as a matter of national significance for implementation.</li> <li>• LMS should equip the implementation unit's office with competent staff and essential resources to ensure the successful and efficient execution of the TAP.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure key stakeholders are on board</li> <li>• Quickly manage allocation and accountability within government institutions.</li> <li>• Government must engage with donors early to secure financing for TAP projects to ensure that activity timelines are met.</li> </ul>

**Gender considerations** are crucial in the implementation of efficient cookstove TAPs. It is vital to recognize and address gender-related concerns to guarantee that these initiatives are inclusive, equitable and successful.

- **Needs Assessment and Planning:**
  - Conducting a gender analysis during the initial needs assessment to understand the specific roles, responsibilities and constraints faced by different genders in relation to cooking practices and energy usage.
  - Identifying gender-specific barriers and opportunities related to the adoption of efficient cookstoves, considering factors such as time spent on cooking, health impacts, economic constraints, and cultural norms.
  - Ensuring that women and men are consulted and actively involved in the planning process to ensure that their needs and priorities are adequately addressed.
- **Capacity Building and Awareness Campaigns:**
  - Developing gender-sensitive training programs and awareness campaigns tailored to the needs and preferences of different gender groups, and highlighting the benefits of efficient cookstoves in ways that resonate with both men and women, such as health, time-saving, economic empowerment, and environmental sustainability.
  - Ensuring that training sessions are accessible and inclusive, taking into account factors such as language, literacy levels, and caregiving responsibilities, and providing practical demonstrations and hands-on training sessions that actively involve participants from diverse gender backgrounds.
  - Addressing gender-specific barriers to participation, such as childcare responsibilities or restrictions on women's mobility, by offering childcare services or organizing training sessions at convenient times and locations.
- **Implementation and Monitoring:**
  - Allocating resources for gender-sensitive monitoring and evaluation of efficient cookstove programs, and collecting disaggregated data on participation rates, behaviour change, and outcomes to assess whether the initiatives are effectively reaching and benefiting different gender groups.
  - Establishing mechanisms for feedback and accountability to ensure that the voices and concerns of women, men, and other gender groups are heard and addressed throughout the implementation process.

- Regularly reviewing and adjusting program activities based on gender-disaggregated feedback and monitoring data to ensure that interventions remain responsive to the evolving needs and priorities of all gender groups.

### 1.1.2.7 Reporting for efficient cookstoves

**Table 1.10: TAP overview table for efficient institutional stoves**

TAP Overview Table								
<b>Sector</b>	Energy							
<b>Sub-sector</b>	Institutional and Household Biomass Use							
<b>Technology</b>	Efficient Cookstoves							
<b>Ambition</b>	<b>By 2030, aim to distribute 30 800 efficient cookstoves to households, schools and institutions primarily in the rural areas that currently rely on inefficient traditional biomass fires</b>							
<b>Benefits</b>	Social:		Improved Health; Time Savings; Safety					
	Economic:		Cost Savings; Income Generation; Local Economy					
	Environmental:		Reduced Fuel Consumption; Lower Emissions; Climate Change Mitigation					
<b>Action</b>	<b>Activities to be implemented</b>	<b>Sources of funding</b>	<b>Responsible body and focal point</b>	<b>Time frame</b>	<b>Risks</b>	<b>Success criteria</b>	<b>Indicators for Monitoring of implementation</b>	<b>Budget per activity</b>
<b>Action 1: Creating a dedicated unit to coordinate and oversee the implementation of TAP initiatives</b>	<b>Activity 1.1:</b> Recruit highly skilled personnel to develop a project implementation strategy for the roll out of the TAP	GoL, CTCN, WB, AfDB, GIZ, USAID	MEF, ME	2	<ul style="list-style-type: none"> <li>Lack of commitment and bureaucratic processes within the responsible organization</li> </ul>	<ul style="list-style-type: none"> <li>Fully equipped implementation unit staffed with skilled personnel.</li> </ul>	<ul style="list-style-type: none"> <li>A functional unit that meets key performance indicators</li> </ul>	37 500
	<b>Activity 1.2:</b> Establish and provide resources for the PIU							
<b>Action 2: Encouraging and promoting the market for efficient cookstoves, rather than relying on technology donations</b>	<b>Activity 2.1:</b> Engage a consultant to evaluate the technology costs and determine a suitable co-financing rate for families with low income.	GoL, GEF, GCF, EU, AfDB, USAID	MEF, ME	1	<ul style="list-style-type: none"> <li>Delays and difficulty in recruiting suitable consultant</li> </ul>	<ul style="list-style-type: none"> <li>Consultant engaged and suitable co-financing mechanisms established</li> </ul>	<ul style="list-style-type: none"> <li>Suitable and working co-financing mechanism established</li> </ul>	7 500
	<b>Activity 2.2:</b> Coordinate with stove manufacturers to market their technology for sale to the public.	GoL, GEF, GCF, EU, AfDB, USAID	MEF, ME	5	<ul style="list-style-type: none"> <li>Non-commitment and bureaucracy on the part of the responsible body in coordinating with stove manufacturers.</li> </ul>	<ul style="list-style-type: none"> <li>Coordination with stove manufacturer to market their technology in place.</li> </ul>	<ul style="list-style-type: none"> <li>Number of manufacturers working with MEF and ME in marketing their technology for sale.</li> </ul>	1 500
<b>Action 3 Enhance access to financing through innovative and affordable financial strategies</b>	<b>Activity 3.1:</b> Coordinating with financial institutions to advocate for reduced interest rates and extended loan terms for the acquisition of efficient cookstoves, and identify potential partners willing to support efficient cookstove technology	GoL	MEF, ME	2	<ul style="list-style-type: none"> <li>Delays in stakeholder coordination</li> </ul>	<ul style="list-style-type: none"> <li>Partnership agreements between MEF and Financial Institutes</li> <li>Increased and available favourable loans to acquire efficient cookstoves</li> <li>Increased number of projects with access to loans</li> </ul>	<ul style="list-style-type: none"> <li>Increased number of loans for businesses and investments in efficient cookstove technology; increased number of efficient cookstoves purchased in rural areas.</li> </ul>	22 500
	<b>Activity 3.2:</b> Coordinating with manufacturers to provide innovative and affordable financial plans or business models for the	GoL, AfDB, GIZ, USAID, GEF, CTCN, GCF, WB,	MEF, ME	4	<ul style="list-style-type: none"> <li>Customer growth rates may not meet the expectations outlined in the</li> </ul>	<ul style="list-style-type: none"> <li>Development of a well-designed business model for efficient cookstove technology</li> </ul>	<ul style="list-style-type: none"> <li>High adoption of efficient cookstove technology through a suitable business model</li> </ul>	15 000

	purchase of efficient cookstoves targeted at people in rural and urban areas.	UNDP, EU, UNEP, UNFCCC,			business plans or models.	that is relevant and appropriate for the context of Lesotho. • Involvement of private developers in the deployment of efficient cookstove technology.	• An effective business model for efficient cookstove technology that is tailored to the specific needs and conditions in Lesotho.	
	<b>Activity 3.3:</b> Expedite the establishment of the <b>Energy Fund</b> and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire efficient cookstoves.	GoL, WB, AfDB, EU, GCF, GEF	MEF, ME, MFD	4	• Delay caused by insufficient resources or limited access to low interest loans • Budget to finance implementation of the TAP may not be available	• Sufficient funds available to support efficient cookstove projects • Easy access to low-interest loans • Growth in uptake of efficient cookstoves loans from financial institutions • Increased adoption of efficient cookstoves	• Number of financial mechanisms from GoL and international partners to ensure the sustainability the Energy Fund • Reports on the disbursement of loans for efficient cookstoves from the revolving fund or Energy Fund	22 500
	<b>Activity 4.1:</b> Engage a public relations firm to conduct a study of the target audience to assist in identifying the appropriate media channels and messaging required for an effective campaign.	GoL, WB, AfDB, EU, GCF, GEF	MEF, ME	2	• Delays and difficulty in recruiting suitable consultant	• Consultant hired, media channels selected, messaging determined.	Number of media channels Messages in all official languages	37 500
<b>Action 4: Increase awareness and knowledge of efficient cookstoves by intensifying information dissemination, public education for various stakeholders</b>	<b>Activity 4.2:</b> Enhance the dissemination of adequate information, public education, and awareness campaigns on efficient cookstoves for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements.	GEF, GCF, EU, USAID, WB	MEF, ME, MICSTI	6	• Inexperience public relations teams • Poor disaggregation of stakeholder groups • Poor material prepared	• Number and types of campaign designed • Number of materials prepared • Number of campaigns performed • Percentage of geographical coverage of campaigns • At least 75% of rural communities are aware of efficient cookstove technology and financial support	• Information and awareness programs are approved and implemented	10 000
	<b>Activity 4.3:</b> Set up information hubs or centres in each district to enhance awareness about the costs, benefits, and performance of efficient cookstoves for local communities, financial institutions, cooperatives, and entrepreneurs.	GoL, WB, EU, other developing partners	MEF, ME	6	• Delay in securing donor financing	• Information hubs or centres established in all 10 districts of Lesotho	• Number of information hubs or centres established in all 10 districts of Lesotho	75 000

<b>Action 5: Strengthen Institutional capacity: Enhanced adoption of efficient cookstoves requires strong and well-coordinated institutions</b>	<b>Activity 5.1:</b> Development and domestication of relevant standards for cookstoves, as well as the enforcement of quality control measures.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GCF, UNEP, GEF, CTCN, UNFCCC	MEF, ME	2	<ul style="list-style-type: none"> <li>• Non-adherence to standards and enforcement</li> <li>• Lack of timely acquisition of donor funding and updating current regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Standards, codes and specifications developed</li> <li>• Number of skilled technical personnel trained to enforce standards</li> </ul>	<ul style="list-style-type: none"> <li>• Standard testing labs functional</li> </ul>	45 000
	<b>Activity 5.2:</b> Providing periodic specialized technical training in efficient cookstove installation, operation, management, maintenance, and business development to enhance the skills of personnel, including technicians and private entrepreneurs, with a focus on gender inclusivity.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GEF, UNEP, GCF, CTCN, UNFCCC	MEF, DoE, MET (TVET)	6	<ul style="list-style-type: none"> <li>• International experts are preferred over local trained staff and technicians, who continue to be unemployed</li> <li>• Nepotism and corruption leading to poor selection of people</li> <li>• Some selected people may not go for training or may not complete</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of highly trained local engineers and contractors</li> <li>• Number of institutions offering training programs</li> </ul>	<ul style="list-style-type: none"> <li>• Well-developed curricula</li> <li>• Number of new direct and indirect jobs for both males and females related to the technology created</li> </ul>	75 000
	<b>Activity 5.3:</b> Strengthen the skills of staff in financial institutions, regulatory agencies and policy-making institutions.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GEF, UNEP, GCF, CTCN, UNFCCC	MEF, ME,	6	<ul style="list-style-type: none"> <li>• High cost for training programs and materials</li> <li>• Those intended to benefit from training programs developed are not willing to participate</li> </ul>	<ul style="list-style-type: none"> <li>• Training program designed and implemented</li> <li>• Number of staff trained</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional capacity and human resources are improved</li> </ul>	15 000
<b>Action 6: Registering and maintaining beneficiary records</b>	<b>Activity 6.1:</b> Engage a consultant to compile the Project Inventory of existing studies on efficient stoves, and to develop standardized data collection tools and protocols to capture relevant information about beneficiaries, including their demographics, household characteristics, socioeconomic status and cooking practices.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GEF, UNEP, GCF, CTCN, UNFCCC	MEF, ME,	2	<ul style="list-style-type: none"> <li>• Preference is in favour of international experts</li> <li>• Delays and difficulty in recruiting suitable consultant t</li> </ul>	<ul style="list-style-type: none"> <li>• Consultant engaged and project Inventory of existing studies undertaken</li> </ul>	<ul style="list-style-type: none"> <li>• Project Inventory of existing studies on efficient stove developed; Standardized data collection tools and protocols to capture relevant information about beneficiaries developed</li> </ul>	15 000
	<b>Activity 6.2:</b> Establishing robust data management systems to securely store, organize, and analyse beneficiary information	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GEF, UNEP, GCF, CTCN, UNFCCC	MEF, ME,	2	<ul style="list-style-type: none"> <li>• Difficulty in securing donor financing</li> </ul>	<ul style="list-style-type: none"> <li>• Secure data management systems to store and analyse beneficial information developed</li> </ul>	<ul style="list-style-type: none"> <li>• Fully functional digital platform developed</li> </ul>	15 000

	<b>Activity 6.3:</b> Designating a specific individual to upload studies, research, and reports on efficient cookstoves to the platform. This person will also be responsible for maintaining the website	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GEF, UNEP, GCF, CTCN, UNFCCC	MEF, ME,	21	<ul style="list-style-type: none"> <li>• Difficulty in finding suitable candidates</li> </ul>	Suitable candidate selected	<ul style="list-style-type: none"> <li>• Studies and reports uploaded</li> <li>• Citizens have access to the website and are actively using it.</li> <li>• Website is well-maintained.</li> </ul>	15 000
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**Gender considerations** are crucial in the reporting of TAP project ideas to ensure gender-responsive initiatives and equitable outcomes. Here are some key steps to incorporate gender perspectives effectively:

1. **Gender Analysis Requirement:** Project proposers should conduct a gender analysis to identify gender-specific needs, priorities, and constraints related to their project ideas.
2. **Gender-Sensitive Criteria:** Evaluation criteria should consider gender perspectives, focusing on tackling gender inequalities, empowering women, and promoting inclusivity across different gender identities.
3. **Inclusive Stakeholder Engagement:** Engage with diverse gender groups throughout the project ideation process to gather input and insights for gender-responsive project ideas.
4. **Gender-Disaggregated Data Collection:** Mandate the collection of gender-disaggregated data to monitor project impacts on different gender groups.
5. **Capacity Building:** Provide training on gender mainstreaming and gender-responsive project design to support project proposers in promoting gender equality.
6. **Peer Review and Feedback:** Establish mechanisms for peer review by gender experts to assess and provide feedback on gender considerations in project ideas.
7. **Monitoring and Reporting Requirements:** Include specific requirements for monitoring and reporting on gender-related indicators and outcomes throughout the project lifecycle.

By incorporating gender considerations into TAP project reporting, initiatives in Lesotho can promote gender equality, social inclusion, and sustainable development.

#### **1.1.2.8 Tracking the implementation status of the TAP**

*Rationale, responsibility and content of TAP tracking:* The national process for monitoring the implementation of efficient cookstoves TAP in Lesotho will require a systematic approach involving various stakeholders and clearly defined institutional roles.

- **Establishment of a Coordination Mechanism:**

- Designating a lead government agency or coordinating body responsible for coordinating and overseeing the implementation and tracking of the Efficient Cookstoves TAP in Lesotho. This could be the Ministry of Environment or Ministry of Energy. *Amongst others, it will have the authority and capability to collaborate with relevant ministries, departments, NGOs, and other stakeholders involved in TAP implementation.*

- **Development of Monitoring Framework:**

- Developing a comprehensive monitoring and evaluation framework for tracking the implementation of efficient cookstoves TAPs. *This framework will outline the objectives,*

*indicators, targets, data sources and reporting mechanisms for monitoring progress and assessing the impact of TAP interventions.*

- **Institutional Responsibilities:**

- Assigning specific institutional responsibilities to relevant government agencies, departments and stakeholders involved in TAP implementation. Responsibilities will include:
  - Ministry of Health: Responsible for monitoring health impacts and promoting awareness of health benefits associated with efficient cookstoves.
  - NGOs and Civil Society Organizations: Responsible for community outreach, capacity building and advocacy on efficient cookstoves adoption.
  - Research Institutions: Responsible for conducting studies, surveys and impact assessments to inform TAP implementation and policy decisions.

- **Timing and Reporting Requirements:**

- **Baseline Assessment:** Conducting a comprehensive baseline assessment to understand the current usage of cookstoves, energy sources, and associated health and environmental impacts. This will be done before the initiation of the TAP.
- Establishing regular reporting cycles for monitoring progress on TAP implementation. This will include quarterly, biannual or annual reporting periods, depending on the timeframe and scope of TAP activities.
- Requiring participating agencies and stakeholders to submit progress reports on their TAP activities, detailing achievements, challenges, lessons learned and future plans. *Reports will be standardized and submitted to the lead agency or coordinating body overseeing TAP implementation.*
- Conducting periodic review meetings or workshops involving relevant stakeholders to discuss progress, share best practices and address challenges encountered during TAP implementation.

- **Information to be Tracked:**

- **Tracking key performance indicators (KPIs) related to TAP objectives, such as:**
  - Number of efficient cookstoves distributed or installed.
  - Percentage of households adopting efficient cookstoves: *Tracking the number of households or communities adopting efficient cookstoves compared to the total target population.*
  - Health benefits associated with improved indoor air quality: *Monitoring improvements in indoor air quality and reductions in respiratory illnesses attributed to the use of cleaner cookstoves.*
  - Socio-economic impacts on women's empowerment, income generation, and time savings.
  - **Environmental Impact:** Assessing the environmental benefits such as reduced deforestation, lower GHG emissions, and improved local air quality.
  - **User Satisfaction:** Gathering feedback from households using efficient cookstoves to understand user satisfaction, usability, and any challenges faced.

- **Collecting qualitative data** through surveys, focus group discussions, and case studies to capture community feedback, perceptions, and experiences related to efficient cookstoves adoption.
- **Monitoring budget expenditures**, resource allocation, and funding gaps to ensure efficient use of financial resources and identify areas for additional support or investment: *Track the allocation and utilization of funds allocated for the TAP, ensuring transparency and accountability.*

By implementing a systematic monitoring process with clear institutional responsibilities, timing, and information tracking mechanisms, Lesotho will effectively track the implementation of efficient cookstoves TAPs, assess progress towards TAP objectives, and make informed decisions to enhance the impact and sustainability of TAP interventions.

**Gender issues:** It will be essential to incorporate gender-specific criteria and targets into the reporting process when implementing efficient cookstoves TAP to ensure that gender considerations are properly addressed and progress towards gender equality is monitored.

- **Gender-Disaggregated Data Collection:**

- Requiring the collection of gender-disaggregated data on various indicators related to efficient cookstoves TAP implementation. This data will include information on the number of men and women reached by TAP activities, as well as their participation rates, preferences, and outcomes.

- **Gender-Responsive Indicators:**

- Developing gender-responsive indicators to assess the impact of TAP interventions on gender equality and women's empowerment. These indicators will include:
  - Percentage of women involved in decision-making processes related to efficient cookstoves adoption.
  - Proportion of households where women have access to and control over efficient cookstoves.
  - Reduction in women's time spent on cooking activities due to the use of efficient cookstoves.
  - Increase in women's income or economic opportunities resulting from efficient cookstoves entrepreneurship or employment opportunities.

- **Gender Mainstreaming Targets:**

- Setting specific targets for gender mainstreaming within TAP implementation activities. These targets should reflect the commitment to promoting gender equality and women's empowerment throughout the TAP lifecycle. Examples of targets will include:
  - Ensuring that at least 50% of beneficiaries reached by efficient cookstoves distribution or training programs are women.
  - Increasing women's participation in leadership roles within TAP implementation committees or working groups to at least 30%.
  - Providing gender-sensitive training and capacity-building opportunities to women entrepreneurs or community leaders involved in promoting efficient cookstoves.

- **Gender Analysis and Reporting:**

- Requiring project implementers to conduct gender analyses and report on gender-specific considerations, challenges, and opportunities encountered during TAP implementation. This will

include documenting gender disparities in access to and use of efficient cookstoves, as well as strategies for addressing these disparities.

- Encouraging project implementers to share case studies, success stories, and lessons learned on gender-responsive approaches to efficient cookstoves promotion and adoption.

- **Stakeholder Engagement and Consultation:**

- Ensuring meaningful engagement and consultation with women, men, and other gender-diverse stakeholders throughout the TAP implementation process. Seeking input and feedback from diverse gender groups to inform decision-making, program design, and reporting.

- **Capacity Building on Gender Mainstreaming:**

- Providing training and capacity-building support to project implementers and stakeholders on gender mainstreaming and gender-responsive reporting. Offering guidance on how to integrate gender considerations into program planning, monitoring, and evaluation processes.

By incorporating these gender-specific criteria and targets into the reporting framework, Lesotho will monitor advancements towards gender equality and women's empowerment in the implementation of efficient cookstoves TAP, pinpoint areas for enhancement, and ensure that TAP initiatives are inclusive and tailored to the requirements of all gender categories.

### **1.1.3 Action Plan for Solar PV Minigrid Systems Technology**

#### **1.1.3.1 Introduction**

Lesotho has significant potential for solar energy. Solar PV minigrid technology provides a viable alternative for meeting the energy demands of residents in many underserved peri-urban and rural areas in Lesotho that are remote from the national grid. They have the capacity to promote socioeconomic growth and improve the living conditions of the people who live in these marginalised peri-urban and rural communities. Mini-grids are small-scale electricity generation and distribution networks that supply electricity to a small group of customers in remote isolated communities or to hundreds of thousands of people in a town or city (ESMAP, 2019). They can range in size from a few kilowatts to 10 megawatts, with smaller systems sometimes referred as to "micro- grids".

Solar PV minigrids offer a range of advantages, including energy security, job creation, improved health outcomes, local economic growth, and contributions to climate change mitigation and adaptation. By providing a clean and sustainable energy source, these minigrids can enhance the well-being of rural populations, particularly women and children. There are various opportunities for public, private, and hybrid initiatives in this sector, as detailed in the TNA Report II. While solar PV technology is well-known to the public, its adoption has been limited due to its intermittent nature and the need for storage solutions to provide power at night. Additionally, powering high-energy appliances with solar energy requires significant investment in equipment. At present, storage options remain costly, except for low-power systems like lighting.

**How the technology is expected to reduce GHG emissions:** The technology is expected to reduce GHG emissions by decreasing the consumption of kerosene for lighting and cooking, as well as reducing the use of fuelwood for cooking and heating. When grid-connected, it will further reduce emissions by decreasing the reliance on imported electricity produced from coal-fired power stations.

**Support for technology prioritisation:** Several reasons were provided by stakeholders to justify the prioritization of this technology. The key points are summarized below.

- **Maturity of technology:** Stakeholders viewed the technology as mature and sustainable.
- **Job creation potential:** The technology has the capacity to generate income in areas without electricity, leading to job creation.
- **Mitigation and Adaptation:** The technology offers a dual benefit of both mitigation and adaptation. It can decrease the need for coal-generated electricity, thereby lowering greenhouse gas emissions. Additionally, in light of frequent droughts, investing in Solar PV can reduce reliance on hydropower.

### 1.1.3.2 Ambition for the TAP

The ambition for this technology is consistent with the Government of Lesotho's aspirations as outlined in the National Electrification Master Plan (EMP 2018) and other national initiatives. The goal is to increase rural electricity access to 75% by 2038, up from the current 51% in 2024, through a combination of grid and off-grid solutions. In line with the EMP 2018 and other national initiatives in the offing, the ambition is to install 160 MW of solar PV capacity. The EMP 2018 outlines a strategy to connect approximately 10 663 households to modern off-grid energy solutions and 379 units to mini-grids each year, starting in 2018. The targeted installation is expected to generate 6 500 GWh electrical energy resulting in avoided GHG emissions of 5 000 Gt CO<sub>2</sub>e over 25 years.

The advantages of this initiative will include: eliminating the use of diesel-powered electricity in off-grid communities, resulting in a reduction of approximately 0.05 MtCO<sub>2</sub>e emissions per year (based on the assumption that 2.5 kg of CO<sub>2</sub> are released into the atmosphere for every litre of kerosene burned (Energypedia, 2024) ; reducing reliance on kerosene for lighting, and lowering fuel costs for users. By replacing inefficient kerosene lighting with electric lighting, development and energy access objectives can be quickly achieved, leading to cost savings and a decrease in climate change impacts.

**Gender issues:** Gender considerations will be integrated into the Technology Action Plan for Solar PV Minigrid projects in rural and peri-urban communities in Lesotho to ensure equitable access, benefits, and sustainability. Integration of gender into the action plan will involve various key strategies such as:

- **Targeted Outreach and Participation:** Implementing strategies to actively involve women in decision-making processes related to the design, implementation, and management of mini-grid projects.
- **Training and Capacity Building:** Providing training and capacity-building programs that are accessible to women and men alike, focusing on both technical and entrepreneurial skills related to mini-grid operation and maintenance.
- **Financial Inclusion:** Facilitating access to financing and microfinance opportunities for women-led initiatives or households headed by women, enabling them to invest in mini-grid technologies or income-generating activities related to energy services.
- **Benefit Sharing and Employment:** Ensuring that employment opportunities generated by mini-grid projects are accessible to women and men equally. Implementing policies that promote fair wages, safe working conditions, and non-discriminatory practices.
- **Monitoring and Evaluation:** Incorporating gender-sensitive indicators into monitoring and evaluation frameworks to assess the impact of mini-grid projects on gender equality and women's empowerment. Regularly reviewing progress and adjusting strategies as needed.

### 1.1.3.3 Actions and activities selected for inclusion in the TAP

Due to the low levels of electrification in Lesotho, the solar PV market shows great development potential. However, there are a number of barriers that need to be overcome before this potential demand

can be translated into effective demand. Table 1.11 below summarises key barriers and measures associated with the transfer and diffusion of solar PV minigrid system which were identified in the BAEF report.

**Table 1.11: Selected barriers and their measures for the solar PV mini-grid system technology**

Category	Identified Barriers	Measures to overcome barriers
Economic and Financial	<ul style="list-style-type: none"> <li>• High initial investments and transaction costs of Solar PV Minigrid Systems</li> <li>• Difficulty in accessing finance</li> </ul>	<ul style="list-style-type: none"> <li>• To address the high investments and transaction costs associated with solar PV mini-grid systems, consider offering loan guarantees or issuing "green bonds" to local and foreign commercial banks. This would allow them to provide investors and developers with lower interest rate loans and longer repayment terms.</li> <li>• Secure concessionary loans or grants from international donors or cooperation agencies to support the development of SMG projects in remote and rural areas within the country.</li> <li>• Introduce subsidies, incentives, and tax exemptions for SMG investors, developers, and households to promote the adoption of technology in underserved remote areas lacking access to the national grid.</li> <li>• Capitalize the Energy Fund and make it operational to provide financial support, capital subsidies, and production-based subsidies to investors, suppliers, dealers, and consumers of off-grid solar PV systems aimed at remote areas lacking electricity access.</li> <li>• Implement established financial business models and create a comprehensive business plan that considers the affordability and willingness to pay for the electricity generated by SMG projects.</li> </ul>
	Limited disposable income among the rural population	<ul style="list-style-type: none"> <li>• Provide grant funding to support agricultural activities, particularly for rural farmers to participate in commercial farming.</li> <li>• Promote the use of solar energy for productive purposes.</li> </ul>
Technical	Inadequate local technical expertise	<ul style="list-style-type: none"> <li>• To address the lack of sufficient local technical expertise, establish capacity-building programs to train both men and women as technicians, engineers, and scientists in the renewable energy sector for tasks such as installation, operation, maintenance, research, and development.</li> </ul>
Institutional	Inadequate legal, regulatory and institutional framework	<ul style="list-style-type: none"> <li>• To overcome the legal, regulatory, and institutional framework barriers to the transfer and diffusion of the SMG, it is essential to develop and adopt clear legal, regulatory, and institutional framework policies.</li> <li>• Ensure strict adherence to best practices and international standards.</li> <li>• Create an enabling environment for private sector initiatives</li> <li>• Enhance the private sector's ability to self-regulate through the appropriate industry associations.</li> </ul>
Information and awareness	Limited information and public awareness	<ul style="list-style-type: none"> <li>• To address the inadequate and limited information barrier, provide adequate information, public education, and awareness campaigns to private investors and the general public on the advantages and opportunities of SMG technology.</li> </ul>
Cultural, social and gender	Low participation of women in the sector.	<ul style="list-style-type: none"> <li>• Provide incentives for women's active participation in the management, development, operations, installations, engineering, procurement, construction, maintenance, and repair works of renewable energy technologies.</li> </ul>

### **Actions selected for inclusion in the TAP for Solar PV Systems**

This section includes a detailed list of the selected measures and their narrative descriptions that will be included in the TAP to enhance the adoption of solar PV mini-grid systems in Lesotho.

**Action 1: Establish a dedicated unit to oversee the implementation** of the TAP is crucial for the successful deployment and adoption of solar home PV systems in the country. This unit will be responsible for coordinating and managing all projects outlined in the TAP, ensuring technical expertise and effective execution. Adequate staffing with skilled personnel is essential for developing TORs, scopes of work, and carrying out project activities.

**Action 2: Reduce the expensive upfront costs of solar PV mini-grid systems** by providing loan guarantees or issuing "green bonds" to local and foreign commercial banks. This will enable them to offer investors/developers loans with lower interest rates and extended repayment terms.

**Action 3: Enhance access to financing** through the utilization of public finance alongside grants, subsidies, concessional loans, and the creation of innovative inclusive financial tools to broaden the reach of off-grid SMG. Implement established financial models and robust business plans that consider both the ability to pay (ATP) and willingness to pay (WTP) for electricity costs from SMG initiatives among underserved remote and low-income communities without grid connectivity. The Energy Fund should be made operational to provide loans to developers, installers, and individuals seeking to access energy from SMG technology

**Action 4: Increase awareness and knowledge on the potential of solar mini-grid systems** through the dissemination of comprehensive information and awareness campaigns across different platforms such as print and electronic media, social media, seminars, workshops, conferences, and community interactions. This initiative aims to equip stakeholders with knowledge about tariff rates, risks, financing options, licensing procedures, as well as the significance and advantages of SMG systems.

**Action 5: Build and strengthen local technical capacity:** Develop a skilled workforce to install, operate, and maintain SMG systems. Successful deployment and diffusion of SMG systems require well-trained and reliable technical expertise to install, operate, and provide after-sales services to customers.

**Action 6: Develop standards for solar PV mini-grid systems** by creating codes and standards and establishing certification, testing, and enforcement institutes. Adequate standards and quality frameworks must be in place to ensure that the SMG systems installed can operate reliably and safely in off-grid environments. To enhance the overall quality and sustainability of SMG, labour skill standards for SMG installers should be developed.

**Activities identified for implementation of selected actions**

This section outlines the selected actions and their associated activities for the TAP for Solar PV Minigrid systems. These actions are based on the measures identified to address barriers and create an enabling environment for the technology, as outlined in the BA&EF report. Table 1.12 below lists the specific activities required for the implementation of each action.

**Table 1.12: Activities identified for implementing selected actions for Solar PV Minigrids**

Action	Activity
<b>Action 1:</b> Establish a Project Implementation Unit (PIU) at the MEF to oversee and lead the implementation of the TAP.	<ul style="list-style-type: none"> <li>Recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP</li> <li>Establish and equip the office of the PIU</li> </ul>
<b>Action 2:</b> Reduce high investment cost of solar PV mini-grid systems	<ul style="list-style-type: none"> <li>MEF and ME should mobilize public and private investment from bilateral or multilateral development agencies for the deployment of SMG systems in remote communities away from the national grid.</li> <li>GoL, through the MFDP, ME and MEF, should provide subsidies and incentives of up to 75% of the capital cost under rural electrification schemes, waive customs import duties to cover the additional costs, and attract investments in communities where incomes are too low to support a cost-recovery tariff.</li> <li>GoL, through the MFDP, should provide loan guarantees or issue "green bonds" to local and foreign commercial banks to enable them to offer long-term and affordable finance to SMG system project developers at different stages of project development.</li> </ul>
<b>Action 3:</b> Enhance access to financing options	<ul style="list-style-type: none"> <li>ME should adopt proven financial business models and develop a high-quality business plan that considers the ATP and WTP for the cost of electricity from SMG projects by remote and low-income groups not connected to the national grid.</li> </ul>

	<ul style="list-style-type: none"> <li>• ME and MFDP should make the Energy Fund operational to provide loans to developers, installers, and rural households seeking access to energy from SMG technology.</li> <li>• MFDP should exempt taxes on all imported solar components and subsidize interest rates.</li> <li>• ME should conduct consultative meetings with financial institutions to identify potential partners willing to support solar technology.</li> </ul>
<b>Action 4:</b> Increase awareness and knowledge on the potential of solar mini-grid systems	<ul style="list-style-type: none"> <li>• ME should conduct promotional campaigns and training programs to educate the public about the advantages of SMG systems and dispel any misconceptions about their reliability.</li> <li>• ME should set up information centres in each district to provide information on the benefits, risks, financing options, licensing procedures, tariff rates, and performance of SMG systems for various stakeholders.</li> </ul>
<b>Action 5:</b> Build/Strengthen capacity of key stakeholders and Institutional frameworks	<ul style="list-style-type: none"> <li>• ME and TVET should include standardized modules on renewable energy technologies in training programs offered by local institutions. These modules should cover SMG systems installation, operation, management, maintenance, and business development. This will help improve the technical skills of personnel, such as technicians, engineers, and private developers, with a focus on gender inclusivity.</li> <li>• ME should adopt a comprehensive strategy to enhance current skills through providing training to personnel in financial institutions, regulatory agencies, and policy-making institutions.</li> <li>• ME should strengthen LEC to absorb more electricity generated from renewable energy sources</li> </ul>
<b>Action 6:</b> Develop standards for solar PV mini-grid systems	<ul style="list-style-type: none"> <li>• LEWA, DOE, and LEC should collaborate to create codes and standards, as well as establish certification, testing, and enforcement institutes.</li> <li>• LEWA and DOE should set up strict technical skill standards and quality control measures for SMG system installers to guarantee high-quality installations.</li> <li>• LEWA and DOE should work together to develop the necessary policy, regulatory, and institutional frameworks to clarify the roles of each stakeholder and facilitate the widespread adoption of SMG systems for rural electrification.</li> </ul>

**Actions to be implemented as Project Ideas:** The actions to be implemented for the project idea on Solar PV Minigrids are outlined below.

**Action 3: Enhance access to financing** through the utilization of public finance alongside grants, subsidies, concessional loans, and the creation of innovative inclusive financial tools to broaden the reach of off-grid SMG. Implement established financial models and robust business plans that consider both the ATP and WTP for electricity costs from SMG initiatives among underserved remote and low-income communities without grid connectivity. The Energy Fund should be made operational to provide loans to developers, installers, and individuals seeking to access energy from SMG technology

**Gender issues:** Enhancing access to financing for solar PV mini-grids through TAP activities will be strategically designed to achieve gender outcomes through the following approaches:

**Gender-Responsive Financing Mechanisms:**

- **Microfinance and Loan Accessibility:** Facilitating access to affordable microfinance and loans specifically tailored for women entrepreneurs or groups, enabling them to invest in solar PV mini-grid projects. This will be achieved through partnerships with microfinance institutions or by creating dedicated funds with favourable terms for women-led initiatives.
- **Grants and Subsidies:** Allocating grants or subsidies that prioritize projects led by or benefiting women, ensuring that financial barriers are minimized and encouraging greater participation in the renewable energy sector.

**1.1.3.4 Stakeholders and timeline for implementation of TAP**

**Overview of Stakeholders for the implementation of the TAP:** There are several key stakeholders whose full cooperation will be needed for the implementation of the TAP. Since the TNA project is under the UNFCCC and the Focal Point is in the Ministry of Environment and Forestry, this Ministry



is therefore its proponent. The technology itself will be implemented on the ground by the Ministry of Energy. There will be other stakeholders involved. Table 1.13 below summarizes the list of key stakeholders and their roles.

**Table 1.13: Roles of stakeholders involved in the implementation of Solar PV Minigrids TAP**

Stakeholder	Action	Role
Ministry of Environment and Forestry (MoEF)	1, 2, 3, 4, 5 and 6	<ul style="list-style-type: none"> <li>• Implementing agency for all the actions and projects proposed in the TAP</li> <li>• Focal Point of the UNFCCC</li> <li>• Sourcing funds from Green Climate Fund and Global Environment Facility</li> <li>• Responsible for environmental policies and management</li> </ul>
Ministry of Energy (MoE)	2, 3, 4, 5, and 6	<ul style="list-style-type: none"> <li>• Formulate policies for the energy sector and create a conducive environment for delivery of electricity and rural electrification.</li> <li>• Promotes renewable energy technologies</li> <li>• Manage the Energy Fund</li> <li>• Develop solar PV standards</li> </ul>
Lesotho Electricity and Water Authority (LEWA)	5 and 6	<ul style="list-style-type: none"> <li>• Regulate the energy sector, issue licenses, approve tariffs, ensure liberalization of the sector, improve service delivery, protect consumers and create a vibrant electricity sector</li> <li>• Monitor and enforce quality standards on all solar PV components and spare parts imported into the country</li> </ul>
Ministry of Finance and Development Planning (MFDP)	3	<ul style="list-style-type: none"> <li>• Responsible for fiscal policies including incentives and subsidies</li> <li>• Negotiate loans for funding renewable energy project</li> </ul>
Ministry of Trade and Industry (MTI)	5	Through Lesotho Standards and Quality Assurance Department, control the quality of imported solar energy components
Technical and Vocational Education and Training	5	Provide technical training courses in solar PV mini-grid systems installation, operation, management, maintenance and business development
Development partners and funds: WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, UNFCCC, GEF, GCF	1, 2, 3, 4, 5 and 6	Provide technical and financial support for diffusion of SMG technology
Non-Governmental Organizations (NGOs)	3 and 4	Advocacy and Awareness; Capacity Building and Training; Funding and Grants:
Women's Groups	4	Community Engagement and Advocacy; Education and Training; Economic Empowerment
Private Sector	2, 3, 4 and 5	Investment and Financing; Business Models and Sustainability; Technology Supply and Innovation

**Scheduling and sequencing of specific activities:** The timeline for planning and implementing the SMG TAP's actions and activities to establish a robust policy framework for deploying prioritized energy sector technologies covers a period of 6 years (2024 to 2030). This timeframe aligns with the achievement of Sustainable Development Goal 7, Lesotho's Revised Nationally Determined Contributions, and National Strategic Development Plan II (2023/24 – 2027/2028) (extension), which are crucial national policies addressing development priorities and climate change mitigation to meet the country's energy sector goals in line with Sustainable Development Goal 7.

Table 1.14 below outlines the sequence and schedule of specific activities and responsibilities.

**Table 1.14: Sequence and schedule of specific activities and responsibilities**

Action	Activity and Responsibility Body	Years					
		1	2	3	4	5	6
<b>Action 1:</b> Establish a Project Implementation Unit (PIU) at the MEF to oversee and lead the implementation of the TAP.	<ul style="list-style-type: none"> <li>MEF to recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP;</li> <li>MEF to establish and equip the office of the PIU.</li> </ul>						
<b>Action 2:</b> Reduce high investment cost of solar PV mini-grid systems	<ul style="list-style-type: none"> <li>MoEF and MOE to mobilize public and private investment from bilateral or multilateral development agencies for the deployment of SMG systems in remote communities away from the national grid.</li> <li>GoL, through the MFDP, ME and MEF, should provide subsidies and incentives of up to 75% of the capital cost under rural electrification schemes, waive customs import duties to cover the additional costs, and attract investments in communities where incomes are too low to support a cost-recovery tariff.</li> <li>GoL, through the MFDP, to provide loan guarantees or issue "green bonds" to local and foreign commercial banks to enable them to offer long-term and affordable finance to SMG system project developers at different stages of project development.</li> </ul>						
<b>Action 3:</b> Enhance access to financing options	<ul style="list-style-type: none"> <li>DOE should adopt proven financial business models and develop a high-quality business plan that considers the ability to pay (ATP) and willingness to pay (WTP) for the cost of electricity from SMG projects by remote and low-income groups not connected to the national grid.</li> <li>DOE and MFDP should make the Energy Fund operational to provide loans to developers, installers, and rural households seeking access to energy from SMG technology.</li> <li>MFDP should exempt taxes on all imported solar components and subsidize interest rates.</li> <li>DOE should conduct consultative meetings with financial institutions to identify potential partners willing to support solar technology.</li> </ul>						
<b>Action 4:</b> Increase awareness and knowledge on the potential of solar mini-grid systems	<ul style="list-style-type: none"> <li>DOE should conduct promotional campaigns and training programs to educate the public about the advantages of SMG systems and dispel any misconceptions about their reliability.</li> <li>DOE should set up information centres in each district to provide information on the benefits, risks, financing options, licensing procedures, tariff rates, and performance of SMG systems for various stakeholders.</li> </ul>						
<b>Action 5:</b> Build/Strengthen capacity of key stakeholders and Institutional frameworks	<ul style="list-style-type: none"> <li>DOE and tertiary institutions should include standardized modules on renewable energy technologies in training programs offered by local institutions. These modules should cover SMG systems installation, operation, management, maintenance, and business development. This will help improve the technical skills of personnel, such as technicians, engineers, and private developers, with a focus on gender inclusivity.</li> <li>DOE should adopt a comprehensive strategy to enhance current skills through providing training to personnel in financial institutions, regulatory agencies, and policy-making institutions. DOE should strengthen LEC to absorb more electricity generated from renewable energy sources</li> </ul>						
<b>Action 6:</b> Develop standards for solar PV mini-grid systems	<ul style="list-style-type: none"> <li>LEWA, DOE, and LEC should collaborate to create codes and standards, as well as establish certification, testing, and enforcement institutes.</li> <li>LEWA and DOE should set up strict technical skill standards and quality control measures for SMG system installers to guarantee high-quality installations.</li> <li>LEWA and DOE should work together to develop the necessary policy, regulatory, and institutional frameworks to clarify the roles of each stakeholder and facilitate the widespread adoption of SMG systems for rural electrification.</li> </ul>						

**Gender issues:** When implementing SMG TAP, it will be essential to take into account gender dynamics among stakeholders and assess how actions and activities impact individuals of different genders.

- **Stakeholder Mapping:** Beginning by identifying all stakeholders involved in the SMG program and ensure that both men and women are represented across various levels of decision-making and implementation.
- **Gender-sensitive Needs Assessment:** Conducting a comprehensive needs assessment that considers the specific energy needs and usage patterns of both men and women in the target communities.
- **Income Generation Opportunities:** Exploring income-generating activities related to SMG that can empower women economically.
- **Monitoring and Evaluation:** Establishing gender-sensitive indicators and mechanisms for monitoring and evaluating the impact of the SMG program.
- **Empowerment and Participation:** Creating opportunities for meaningful participation and leadership of women in decision-making processes related to SMG and ensuring that women have a voice in project planning, implementation, and evaluation, and that their perspectives are valued and incorporated into program activities.

### 1.1.3.5 Estimation of resources needed for action and activities

**Estimation of capacity building needs:** To execute the defined activities for the technology's implementation, it is essential to have access to both human and material resources. In collaboration with stakeholders, the capacity development needs for efficient implementation of the TAP's actions and activities, as well as strengthening of the enabling framework for energy sector technologies, were identified. There is a need to build capacity in sourcing international funds as well as training and accrediting local personnel to ensure accelerated diffusion of the technology in the country.

#### **Human Resources:**

- Social science professionals with statistical knowledge for various studies.
- Trained facilitators to promote and support project initiatives.
- Finance and fund management specialists.
- Experts in credit and banking.
- Teamwork, budget management, and project management skills.

#### **Material Resources:**

- Financial support for organizing workshops and training sessions.
- Vehicles for transporting professionals to facilitate nationwide socialization and capacity building.
- Funding for conducting workshops, training sessions and socialization activities.

**Estimations of costs of actions and activities:** The cost estimates for the implementation of TAP's actions and activities were developed in collaboration with stakeholders, considering the expenses related to similar activities within the country. Table 1.15 outlines the estimated costs in US dollars for each specific action and activity over the planned period. The overall estimated cost for the implementation of SMG including Gender-Responsive Capacity Building stands at USD 1 537 500.

**Table 1.15: Estimated Costs for Developing Solar PV Minigrids**

Actions	Activities to be support	Estimated Costs (USD)
<b>Action 1:</b> Establish a Project Implementation Unit (PIU) at the MEF to oversee and lead the implementation of the TAP	Recruiting highly skilled personnel to develop a project implementation plan for the rollout of the TAP	22 500
	Establishing and equipping the office of the PIU	15 000
<b>Action 2:</b> Reduce high investment cost of solar PV mini-grid systems	MEF and ME to mobilize public and private investment from bilateral or multilateral development agencies for the deployment of SMG systems in remote communities away from the national grid.	1,000,000
	GoL, through the MFDP, ME and MEF, should provide subsidies and incentives of up to 75% of the capital cost under rural electrification schemes, waive customs import duties to cover the additional costs, and attract investments in communities where incomes are too low to support a cost-recovery tariff.	10 000
	GoL, through the MFDP, to provide loan guarantees or issue "green bonds" to local and foreign commercial banks to enable them to offer long-term and affordable finance to SMG system project developers at different stages of project development	20 000
<b>Action 3:</b> Enhance access to financing options	DOE should adopt proven financial business models and develop a high-quality business plan that considers the ATP and WTP for the cost of electricity from SMG projects by remote and low-income groups not connected to the national grid.	25 000
	DOE and MFDP should make the Energy Fund operational to provide loans to developers, installers, and rural households seeking access to energy from SMG technology.	800 000
	MFDP should exempt taxes on all imported solar components and subsidize interest rates.	35 000
	DOE should conduct consultative meetings with financial institutions to identify potential partners willing to support solar technology	30 000
<b>Action 4:</b> Increase awareness and knowledge on the potential of solar mini-grid systems	DOE should conduct promotional campaigns and training programs to educate the public about the advantages of SMG systems and dispel any misconceptions about their reliability.	200 000
	DOE should set up information centres in each district to provide information on the benefits, risks, financing options, licensing procedures, tariff rates, and performance of SMG systems for various stakeholders.	150 000
<b>Action 5:</b> Build/Strengthen capacity of key stakeholders and Institutional frameworks	DOE and tertiary institutions should include standardized modules on renewable energy technologies in training programs offered by local institutions. These modules should cover SMG systems installation, operation, management, maintenance, and business development. This will help improve the technical skills of personnel, such as technicians, engineers, and private developers, with a focus on gender inclusivity.	700 000
	Establishing information hubs or centres in each district to increase and improve awareness about efficient cookstove equipment costs, benefits and performance for local communities, financial institutions, cooperatives, and entrepreneurs.	250 000
<b>Action 6:</b> Develop standards for solar PV mini-grid systems	DOE should adopt a comprehensive strategy to enhance current skills through providing training to personnel in financial institutions, regulatory agencies, and policy-making institutions. DOE should strengthen LEC to absorb more electricity generated from renewable energy sources	45 000
	LEWA, DOE, and LEC should collaborate to create codes and standards, as well as establish certification, testing, and enforcement institutes.	75 000

	LEWA and DOE should set up strict technical skill standards and quality control measures for SMG system installers to guarantee high-quality installations.	50 000
	LEWA and DOE should work together to develop the necessary policy, regulatory, and institutional frameworks to clarify the roles of each stakeholder and facilitate the widespread adoption of SMG systems for rural electrification	40 000
<b>Total</b>		<b>2 467 500</b>

**Gender Issues:** It will be essential to integrate gender-responsive approaches into capacity building for efficient cookstoves as part of the TAP implementation. This ensures equitable access to resources, opportunities, and benefits across all genders, as detailed in Table 1.16 below:

**Table 1.16: Gender-Responsive Capacity Building**

	Activities to be supported	Estimated Costs (USD)
Gender-Responsive Capacity Building	Conduct a gender-inclusive needs assessment to understand the specific roles, needs, and constraints of men and women in rural communities regarding solar PV minigrids. Identify skills, knowledge gaps, and barriers faced by different genders in accessing solar energy technologies.	35 000
	Promoting Women's Participation: Actively involve women in all capacity building activities, including planning, training, workshops, and decision-making processes for minigrid implementation. Offer mentorship and support to empower women for leadership roles.	35 000

### 1.1.3.6 Management planning

**Risks and Contingency Planning:** The field of solar PV is among the most emerging technologies and rapid innovations are taking place in this field. Table 1.17 below summarizes the primary risks identified in the activities, along with the corresponding contingency plans to mitigate these risks, ensuring the successful implementation of the Solar PV Minigrids TAP.

**Table 1.17: Overview of risk categories and possible contingencies for promoting solar PV Minigrid TAP**

Type of risk	Description	Contingency plan
Cost risks	Delays in securing donor funds	GoL use budgetary support to set up the implementation unit, finance the preparation of the public awareness and promotional campaigns and utilize donor funds for implementation.
Scheduling risks	Delays in putting in place regulations and policies to facilitate the diffusion of the SMG technology.	Integrate policies and regulations with regards to solar PV mini grids and rural electrification in general into the national policies on electrification and renewable energy integration into the grid.
Performance risks	Delays in decision making regarding incentives, subsidies and implementation. Failures of the installed mini-grid system to perform according to the expectations of the mini-grid operator and the customers	<ul style="list-style-type: none"> <li>• Ensure there is strong high-level political and institutional acceptance or support from the Cabinet and also key Ministries and agencies.</li> <li>• Use standardised components which adhere to quality standards and rely on component suppliers who offer quality products that come with comprehensive warranty and customer service.</li> </ul>
Information risk	Information not being provided in a timely manner and inadequate cooperation or collaboration amongst stakeholders	Establish project steering committee to bring together key Ministries and institutions into the implementing process. Ensure that the project will be managed by professional managers with proven track record using best management practices
Political risk	With change of government usually the priorities also change	<ul style="list-style-type: none"> <li>• Review and readjust the program in the light of policy changes</li> <li>• Investors and lenders must obtain political risk insurance or multilateral development bank guarantees to cover risks such as breach of contract, changes in political regime, currency inconvertibility, expropriation, terrorism, war, and civil unrest.</li> </ul>

*Next Steps:* Table 1.18 below summarizes the immediate requirements and critical steps for the successful implementation of the SMG TAP.

**Table 1.18: Summary of immediate requirements and critical steps for the implementation of SMG TAP**

Immediate requirements	Critical steps
<ul style="list-style-type: none"> <li>• LMS, along with key stakeholders, must incorporate this TAP into the country's NDCs and NAMAs. The project should be recognized as a matter of national significance for implementation</li> <li>• The LMS should provide the implementation unit's office with skilled personnel and necessary resources to guarantee the effective and efficient implementation of the TAP.</li> <li>• GoL should develop a budget line for funding TAP activities</li> <li>• Comprehensive mapping should be done to identify ideal locations and sites for mini-grid installations, as well as any planned main grid expansions, to serve as a crucial reference for developers considering solar PV mini-grid projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure key stakeholders are on board</li> <li>• Quickly manage allocation and accountability within government institutions.</li> <li>• Government must engage with donors early to secure financing for TAP projects to ensure that activity timelines are met.</li> </ul>

Implementing the TAP for Solar PV Mini-grids will involve identifying and mitigating gender issues to ensure equitable outcomes and maximize the benefits of renewable energy for all.

- Identification of Gender Issues
  - **Needs Assessment:** Identifying specific gender-related barriers and opportunities related to solar PV mini-grid implementation:
  - **Policy and Institutional Analysis:** Reviewing existing policies and institutional frameworks to assess their gender responsiveness and identifying potential gaps or barriers that may hinder equitable participation and benefits from the TAP.
- Mitigation Strategies
  - **Gender-Responsive Planning and Design:** Integrating gender considerations into the design and planning phases of the TAP, ensuring that project objectives, activities, and outcomes are aligned with gender equality goals.
  - **Establishing clear gender-responsive targets and indicators** to monitor progress and outcomes throughout the project lifecycle.
  - **Capacity Building and Training:** Developing and implementing gender-responsive capacity building programs tailored to the needs identified in the gender analysis.

### 1.1.3.7 Reporting for solar PV mini-grids system

**Table 1.19: TAP overview table for Solar PV Minigrids**

TAP Overview Table								
<b>Sector</b>	Energy							
<b>Sub-sector</b>	Electricity Generation							
<b>Technology</b>	Solar PV Mini-grid System							
<b>Ambition</b>	<b>Install 160 MW of solar PV capacity to achieve 75% electricity access by 2030.</b>							
<b>Benefits</b>	Social		Improved Health; Time Savings; Safety; job creation					
	Economic		Improved balance of payments; Income Generation; Local Economy					
	Environmental		Reduced fuelwood Consumption; Lower Emissions; Climate Change Mitigation					
<b>Action</b>	<b>Activities to be implemented</b>	<b>Sources of funding</b>	<b>Responsible body and focal point</b>	<b>Time frame</b>	<b>Risks</b>	<b>Success criteria</b>	<b>Indicators for Monitoring of implementation</b>	<b>Budget per activity in USD</b>
<b>Action 1: Establish PIU at the MEF to oversee and lead the implementation of the TAP.</b>	<b>Activity 1.1:</b> Recruit highly skilled personnel to develop a project implementation strategy for the roll out of the TAP	CTCN, WB, AfDB, GIZ, USAID	MEF, ME	2	<ul style="list-style-type: none"> <li>Lack of commitment and bureaucratic processes within the responsible organization</li> </ul>	<ul style="list-style-type: none"> <li>Fully equipped implementation unit staffed with skilled personnel.</li> </ul>	<ul style="list-style-type: none"> <li>A functional unit that meets key performance indicators</li> </ul>	37 000
	<b>Activity 1.2:</b> Establish and provide resources for the PIU.							
<b>Action 2: Reduce high investment cost of solar PV mini-grid systems</b>	<b>Activity 2.1:</b> Mobilize public and private investment from bilateral or multilateral development agencies for the deployment of SMG systems in remote communities away from the national grid.	GEF, GCF, WB, EU, AfDB, USAID	MEF, ME, MFDP,	6	<ul style="list-style-type: none"> <li>Delay in securing donor financing</li> </ul>	<ul style="list-style-type: none"> <li>Increased number of projects and budget for SMG</li> <li>Amount of bilateral and multilateral financing</li> </ul>	<ul style="list-style-type: none"> <li>Number of project proposals developed, submitted and funded</li> </ul>	1 000 000
	<b>Activity 2.2:</b> Provide subsidies and incentives of up to 75% of the capital cost under rural electrification schemes, waive customs import duties to cover the additional costs, and attract investments in communities where incomes are too low to support a cost-recovery tariff.	GoL, GEF, GCF, EU, AfDB, USAID	MEF, ME, MFDP	5	<ul style="list-style-type: none"> <li>Delay in decision making by GoL regarding incentives and subsidies</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of a comprehensive incentives and subsidies policy for the diffusion of the technology</li> </ul>	<ul style="list-style-type: none"> <li>Number and type of incentives in place</li> </ul>	10 000
	<b>Activity 2.3:</b> Provide loan guarantees or issue "green bonds" to local and foreign commercial banks to enable them to offer long-term and affordable finance to SMG system project developers at different stages of project development.	GoL, EU, WB, GCF, GEF	MFDP	5	<ul style="list-style-type: none"> <li>Insufficient funds available</li> </ul>	<ul style="list-style-type: none"> <li>Banks are offering loans for SMG projects</li> </ul>	<ul style="list-style-type: none"> <li>Number of loans provided for SMG projects</li> </ul>	20 000
<b>Action 3: Enhance access to financing options</b>	<b>Activity 3.1:</b> Adopt proven financial business models and develop a high-quality business plan that considers the ability to pay (ATP) and willingness to pay (WTP) for the cost of electricity from SMG projects by remote and low-income groups not connected to the national grid.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, GEF, GCF, UNFCCC	MEF, ME	4	<ul style="list-style-type: none"> <li>Customer growth rates could fall well below those envisaged in the business plans or models</li> </ul>	<ul style="list-style-type: none"> <li>Development of a well-designed business model for SMG technology that is relevant and appropriate for the Lesotho context</li> </ul>	<ul style="list-style-type: none"> <li>High uptake of SMG electricity using business model</li> <li>A well-designed business model for SMG technology that is relevant and</li> </ul>	25 000

						<ul style="list-style-type: none"> <li>Number of private developers involved in SMG deployment</li> </ul>	appropriate for Lesotho context	
	<p><b>Activity 3.2:</b> Make the Energy Fund operational to provide loans to developers, installers, and rural households seeking access to energy from SMG technology.</p>	GoL, WB, AfDB, EU, GCF, GEF, USAID	MEF, ME, MFDP	3	<ul style="list-style-type: none"> <li>Delay due to insufficient resources</li> </ul>	<ul style="list-style-type: none"> <li>Sufficient funds available to support SMG projects</li> <li>Revolving loan fund established</li> </ul>	<ul style="list-style-type: none"> <li>Number of financial mechanisms from government and international partners available to make Energy Fund</li> <li>Sustainable Number of loans provided by Fund</li> </ul>	800 000
	<p><b>Activity 3.3:</b> Exempt taxes on all imported solar components and subsidize interest rates; conduct consultative meetings with financial institutions to identify potential partners willing to support solar technology.</p>	GoL, WB, AfDB, EU, GCF, GEF, CTCN	MEF, ME, MFDP	5	<ul style="list-style-type: none"> <li>Delay caused by insufficient resources or limited access to low interest loans</li> <li>Budget to finance implementation of the TAP may not be available</li> </ul>	<ul style="list-style-type: none"> <li>Sufficient funds available to support efficient cookstove projects</li> <li>Easy access to low-interest loans</li> </ul>	<ul style="list-style-type: none"> <li>Number of financial mechanisms from GoL and international partners to ensure the sustainability the Energy Fund</li> </ul>	35 000
<b>Action 4: Increase awareness and knowledge on the potential of solar mini-grid systems</b>	<p><b>Activity 4.1:</b> Conduct promotional campaigns and training programs to educate the public about the advantages of SMG systems and dispel any misconceptions about their reliability.</p>	GEF, GCF, EU, USAID, WB, AfDB	MEF, ME,	6	<ul style="list-style-type: none"> <li>Inexperience public relations teams</li> <li>Poor disaggregation of stakeholder groups</li> <li>Poor material prepared</li> </ul>	<ul style="list-style-type: none"> <li>Number and types of campaign designed</li> <li>Number of materials prepared</li> <li>Number of campaigns performed</li> <li>Geographical coverage of campaigns</li> <li>At least 75% of rural communities are aware of SMG technology and financial support</li> </ul>	<ul style="list-style-type: none"> <li>Information and awareness programs are approved and implemented</li> </ul>	200 000
	<p><b>Activity 4.2:</b> Set up information centres in each district to provide information on the benefits, risks, financing options, licensing procedures, tariff rates, and performance of SMG systems for various stakeholders.</p>	GoL, WB, EU, other developing partners	MEF, ME	5	<ul style="list-style-type: none"> <li>Delay in securing donor financing</li> </ul>	<ul style="list-style-type: none"> <li>Information hubs or centres established in all 10 districts of Lesotho</li> </ul>	<ul style="list-style-type: none"> <li>Number of information hubs or centres established in all 10 districts of Lesotho</li> </ul>	150 000
<b>Action 5: Build/Strengthen capacity of key stakeholders and Institutional frameworks</b>	<p><b>Activity 5.1</b> Tertiary institutions should include standardized modules on renewable energy technologies in training programs offered by local institutions. These modules should cover SMG systems installation, operation,</p>	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, GEF,	MEF, ME, Tertiary institutes	6	<ul style="list-style-type: none"> <li>Preference is in favour of international experts</li> <li>High cost for training material and train the trainer</li> </ul>	<ul style="list-style-type: none"> <li>Availability of highly trained engineers and contractors</li> <li>Program designed and implemented</li> </ul>	<ul style="list-style-type: none"> <li>Well-developed curricula</li> <li>No of persons trained</li> <li>Number of Institutions</li> </ul>	700 000



	management, maintenance, and business development. This will help improve the technical skills of personnel, such as technicians, engineers, and private developers, with a focus on gender inclusivity	GCF, UNFCCC					<ul style="list-style-type: none"> <li>number of institutions implementing training programs</li> </ul>	equipped to conduct training	
	<b>Activity 5.2:</b> Adopt a comprehensive strategy to enhance current skills through providing training to personnel in financial institutions, regulatory agencies, and policy-making institutions. DOE should strengthen LEC to absorb more electricity generated from renewable energy sources	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, GEF, GCF, UNFCCC	MEF, DoE, MET, LEC	6	<ul style="list-style-type: none"> <li>High cost for training program and materials</li> <li>Those for whom training programs are developed are not interested in participating</li> </ul>	<ul style="list-style-type: none"> <li>Training program designed and implemented</li> <li>Number of staff trained</li> </ul>	<ul style="list-style-type: none"> <li>Institutional capacity and human resources are improved</li> </ul>		250 000
<b>Action 6: Develop standards for solar PV mini-grid systems</b>	<b>Activity 6.1:</b> Collaborate to create codes and standards, as well as establish certification, testing, and enforcement institutes.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, GCF, GEF, UNEP, CTCN, UNFCCC	MEF, ME,	2	<ul style="list-style-type: none"> <li>Non-compliance and enforcement of standards</li> <li>Delay due to changing or revising existing regulations or laws</li> </ul>	<ul style="list-style-type: none"> <li>Standards, codes and certification scheme developed</li> <li>Number of skilled technical personnel trained to enforce standards</li> </ul>	<ul style="list-style-type: none"> <li>Standard testing labs functional</li> </ul>		75 000
	<b>Activity 6.2:</b> Set up strict technical skill standards and quality control measures for SMG system installers to guarantee high-quality installations.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, GEF, GCF, UNFCCC	MEF, ME,	4	<ul style="list-style-type: none"> <li>Non-compliance and enforcement of standards</li> <li>Delay due to changing or revising existing regulations or laws</li> </ul>	<ul style="list-style-type: none"> <li>Labour skill standards developed, approved, and enforced</li> <li>Number of skilled technical personnel trained to enforce standards</li> </ul>	<ul style="list-style-type: none"> <li>Number of skilled technical personnel trained to enforce standards</li> </ul>		50 000
	<b>Activity 6.3:</b> Work together to develop the necessary policy, regulatory, and institutional frameworks to clarify the roles of each stakeholder and facilitate the widespread adoption of SMG systems for rural electrification.	GoL, WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, GEF, GCF, UNFCCC	MEF, ME	5	<ul style="list-style-type: none"> <li>Lack of participation from key institutional stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Multi-stakeholders committee set up and operational through regular meetings</li> </ul>	<ul style="list-style-type: none"> <li>Number of institutions participating in committee meeting</li> </ul>		85 000
	<b>Total estimate funding requirements</b>								

**Gender issues:** Incorporating gender considerations in the reporting of TAP project ideas will be essential to ensure that initiatives are gender-responsive and promote equitable outcomes.

- **Gender Analysis Requirement:** Making it a requirement for project proposers to conduct a gender analysis as part of their project idea reporting. This analysis should identify the gender-specific needs, priorities, and constraints related to the proposed project, as well as strategies for addressing them.
- **Gender-Sensitive Criteria:** Creating evaluation criteria that consider gender perspectives when assessing TAP project ideas. Evaluating project proposals based on their capacity to tackle gender inequalities, empower women, and encourage inclusivity and engagement across various gender identities.
- **Inclusive Stakeholder Engagement:** Encouraging project proposers to engage with diverse gender groups throughout the project ideation and reporting process. Consult with women, men, and other gender-diverse stakeholders to gather input, feedback, and insights that inform the development of gender-responsive project ideas.
- **Gender-Disaggregated Data Collection:** Mandating that project proposers gather and report gender-disaggregated data on project impacts, outcomes, and beneficiaries. This data should provide insight into how the proposed project will affect different gender groups and enable monitoring and evaluation of gender-related outcomes over time.
- **Capacity Building:** Offering capacity-building support to project proposers on gender mainstreaming and gender-responsive project design. Providing training on gender analysis, gender-sensitive reporting, and best practices for promoting gender equality and social inclusion within TAP projects.
- **Peer Review and Feedback:** Establishing mechanisms for peer review and feedback on project ideas, including gender experts or reviewers with expertise in gender mainstreaming. Encouraging reviewers to assess the extent to which project ideas incorporate gender considerations and provide constructive feedback for improvement.
- **Monitoring and Reporting Requirements:** Including specific requirements for monitoring and reporting on gender-related indicators and outcomes throughout the project lifecycle. This may include regular progress reports, gender-sensitive impact assessments, and case studies highlighting gender-responsive practices and lessons learned.

Incorporating gender considerations into the reporting of TAP project ideas ensures that initiatives in Lesotho are developed and executed in ways that promote gender equality, social inclusion, and sustainable development.

#### **1.1.3.8 Tracking the implementation status of the TAP**

**Rationale, responsibility and content of TAP tracking:** Proposing a national process for tracking the implementation of Solar PV Minigrids TAPs in Lesotho requires a systematic approach involving multiple stakeholders and clear institutional responsibilities.

- **Establishment of a Coordination Mechanism:**
  - Designating a lead government agency or coordinating body responsible for coordinating and overseeing the implementation and tracking of the SMG TAP Lesotho. This could be the Ministry of Environment and Environment or Ministry of Energy. *It will have the authority and capability*

*to collaborate with relevant ministries, departments, NGOs, and other stakeholders involved in TAP implementation.*

- **Development of Monitoring Framework:**

- Developing a comprehensive monitoring and evaluation framework for tracking the implementation of SMG TAPs. *This framework should outline the objectives, indicators, targets, data sources, and reporting mechanisms for monitoring progress and assessing the impact of TAP interventions.*

- **Institutional Responsibilities:**

- Assigning specific institutional responsibilities to relevant government agencies, departments, and stakeholders involved in TAP implementation. Responsibilities may include:
  - Ministry of Health: Responsible for monitoring health impacts and promoting awareness of health benefits associated with SMG.
  - NGOs and Civil Society Organizations: Responsible for community outreach, capacity building, and advocacy on SMG adoption.
  - Research Institutions: Responsible for conducting studies, surveys, and impact assessments to inform TAP implementation and policy decisions.

- **Timing and Reporting Requirements:**

- **Baseline Assessment:** Conducting a comprehensive baseline assessment to understand the current usage of energy sources, and associated health and environmental impacts. This will be done before the initiation of the TAP.
- Establishing regular reporting cycles for monitoring progress on TAP implementation. This may include quarterly, biannual or annual reporting periods, depending on the timeframe and scope of TAP activities.
- Requiring participating agencies and stakeholders to submit progress reports on their TAP activities, detailing achievements, challenges, lessons learned, and future plans: *Reports should be standardized and submitted to the lead agency or coordinating body overseeing TAP implementation.*
- Conducting periodic review meetings or workshops involving relevant stakeholders to discuss progress, share best practices, and address challenges encountered during TAP implementation.

- **Information to be Tracked:** Tracking key performance indicators (KPIs) related to TAP objectives, such as:

- **Baseline assessment:** Establishing a baseline for the current state of solar PV mini-grid deployment and associated GHG gas emissions.
- **GHG emissions reductions:** Quantifying the expected and actual reductions in GHG emissions achieved through the deployment of solar PV mini-grids, using established methodologies and emission factors.
- **Percentage of households adopting Solar PV Minigrids electricity:** Tracking the number of households or communities adopting Solar PV Minigrids electricity compared to the total target population.
- **Socio-economic impacts** on women's empowerment, income generation, and time savings.

- **User Satisfaction:** Gather feedback from households SMG to understand user satisfaction, usability, and any challenges faced.
- **Collecting qualitative data through surveys, focus group discussions,** and case studies to capture community feedback, perceptions, and experiences related to Solar PV Minigrids electricity.
- **Monitoring budget expenditures, resource allocation, and funding gaps** to ensure efficient use of financial resources and identify areas for additional support or investment: Track the allocation and utilization of funds allocated for the TAP, ensuring transparency and accountability.

By implementing a systematic monitoring process with clear institutional responsibilities, timing, and information tracking mechanisms, Lesotho will effectively track the implementation of SMG TAPs, assess progress towards TAP objectives, and make informed decisions to enhance the impact and sustainability of TAP interventions.

**Gender issues:** Integrating gender-specific criteria and targets into the reporting process during efficient cookstoves TAP implementation is essential for ensuring that gender considerations are adequately addressed and progress towards gender equality is tracked.

- **Gender-Disaggregated Data Collection:**

- Requiring the collection of gender-disaggregated data on various indicators related to Solar PV Minigrids TAP implementation. This data should include information on the number of men, women, and other gender groups reached by TAP activities, as well as their participation rates, preferences, and outcomes.

- **Gender-Responsive Indicators:** Developing gender-responsive indicators to assess the impact of TAP interventions on gender equality and women's empowerment. These indicators may include:

- Percentage of women involved in decision-making processes related to Solar PV Minigrids electricity adoption.
- Reduction in women's time spent on cooking activities due to the use of Solar PV Minigrids electricity.
- Increase in women's income or economic opportunities resulting from Solar PV Minigrids electricity entrepreneurship or employment opportunities.

- **Gender Mainstreaming Targets:** Setting specific targets for gender mainstreaming within TAP implementation activities. These targets should reflect the commitment to promoting gender equality and women's empowerment throughout the TAP lifecycle. Examples of targets may include:

- Increasing women's participation in leadership roles within TAP implementation committees or working groups to at least 30%.
- Providing gender-sensitive training and capacity-building opportunities to women entrepreneurs or community leaders involved in Solar PV Minigrids electricity.

- **Stakeholder Engagement and Consultation:**

- Ensuring meaningful engagement and consultation with women, men, and other gender-diverse stakeholders throughout the TAP implementation process. Seek input and feedback from diverse gender groups to inform decision-making, program design, and reporting.

- **Capacity Building on Gender Mainstreaming:**

- Providing training and capacity-building support to project implementers and stakeholders on gender mainstreaming and gender-responsive reporting. Offer guidance on how to integrate gender considerations into program planning, monitoring, and evaluation processes.

## **1.1.4 Action Plan for Energy-Efficient Lighting**

### **1.1.4.1 Introduction**

Introducing LED lighting for grid-connected systems and solar lanterns for off-grid areas as alternatives to kerosene lamps and candles is a key strategy for reducing energy consumption and GHG emissions. This initiative is in line with Lesotho's commitment to decreasing its carbon footprint and advancing towards a more sustainable energy landscape. The integration of energy-efficient lighting solutions, such as LEDs and solar lanterns, is crucial for addressing the energy challenges faced by Lesotho. Solar lanterns offer a cleaner and safer alternative to kerosene lamps and candles in areas lacking electricity access, leading to improved health outcomes and reduced GHG emissions. In grid-connected regions, the adoption of LEDs can significantly lower energy usage and costs, supporting national efforts to curb energy demand and promote sustainability. By transitioning to LED lighting, Lesotho can reduce its dependence on imported electricity, resulting in decreased GHG emissions associated with energy consumption, as imported electricity typically carries a higher carbon footprint.

In 2017, Lesotho emitted a total of 5 660.44 Gg CO<sub>2</sub>e, with 2 861.17 Gg CO<sub>2</sub>e (50.5%) coming from the energy sector. The residential sector was the primary source of emissions in Lesotho's energy sector, contributing 1 900.86 Gg CO<sub>2</sub>e (66.3%), as reported in Lesotho's 4th GHG Inventory Report for the years 2011-2017. The commercial/institutional sector was the third largest contributor, accounting for 422.5 Gg CO<sub>2</sub>e (15%)<sup>12</sup>. The electricity efficiency in the residential and commercial sectors remains low. A key technology focus for these sectors is encouraging the adoption of energy-efficient light-emitting diodes (LEDs) as a replacement for compact fluorescent lamps (CFLs) and inefficient incandescent light bulbs (ILBs). The commercial/institutional and residential sectors have been considered the main sources of GHG emissions, as emissions from these sectors have shown an increasing tendency over the years.

Issues related to energy efficiency have been addressed in the Regional Compliance Framework for Energy Efficient Lighting and Appliances in the SADC and EAC Regions<sup>13</sup>, and the Energy Efficiency Builders Manual for Lesotho<sup>14</sup>, adopted in 2022. Although the government has not defined a strategy for prioritized technologies in this sub-sector, there are some existing initiatives to promote the use of high-efficiency lighting and appliance systems.

### **Country Economic Development Benefits**

- Widespread adoption of the product has the potential to lower individual household energy consumption, leading to a decrease in the country's overall energy consumption. This could help reduce energy demand in households, public buildings, and commercial establishments, ultimately decreasing reliance on energy imports from fossil fuel power plants in the SAPP region.

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<sup>12</sup> [https://unfccc.int/sites/default/files/resource/NAI\\_BUR1.pdf](https://unfccc.int/sites/default/files/resource/NAI_BUR1.pdf)

<sup>13</sup> Framework Document, Regional Compliance Framework for Energy Efficient Lighting and Appliances in the SADC and EAC Regions, 2021

<sup>14</sup> Energy Efficiency Builders Manual for Lesotho, Ministry of Local Government & Chieftainship Affairs, Department of National Housing, February 2022

- Entrepreneurial advantages include the ability to import and sell a wide range of LED fixtures for residential, commercial, and other buildings.
- The cost savings for customers can then be redirected into other areas of the economy.

### **Social Benefits**

- LED technologies enhance health and living conditions for building occupants especially as it relates to the eyes. The use of high-frequency electronic ballasts helps reduce eyestrain and fatigue, increase productivity in workplaces and provide a better quality of life<sup>15</sup>.
- Society would gain an understanding of energy-efficient technology available for buildings which they can implement to assist in reducing their energy demand and consumption.

#### **1.1.4.2 Ambition for the TAP**

The revised NDC 2024 sets an ambitious target to provide approximately 64 050 solar LED lamps to rural households by 2030, replacing the use of paraffin/kerosene and candles for lighting. This initiative is expected to reduce 16.21 kilotons of CO<sub>2</sub> emissions by 2030. Additionally, the strategy involves distributing approximately 50 000 LED bulbs to electrified homes, institutions and businesses over a two-year period, replacing the use of ILBs and CFLs.

By using LED technology, homeowners can enjoy the advantages of lowering their electricity bills and helping to reduce GHG emissions. This aligns with the government's focus on promoting energy security. Switching to energy-efficient lighting such as LEDs will also reduce the need for expensive electricity imports from ESKOM in South Africa, where more than 70% of electricity generation comes from coal and is therefore GHG intensive.

**Gender issues:** When developing the TAP for Energy-Efficient Lighting gender considerations will focus on ensuring equal access, usage, and benefits of the technology across different genders. This includes:

- **Education and Awareness:** Developing educational initiatives and awareness campaigns tailored to various genders to highlight the benefits of energy-efficient lighting and appliances.
- **Economic Opportunities:** Recognizing and advocating for economic prospects linked to energy-efficient technologies that are inclusive for individuals of all genders. This includes fostering entrepreneurship in the energy sector and ensuring equitable job opportunities in industries affected by energy efficiency initiatives.

#### **1.1.4.3 Actions and activities selected for inclusion in the TAP**

This section outlines the actions and activities that have been chosen to be included in the TAP for energy-efficient lighting and appliances.

**Summary of barriers and measures to overcome barriers:** The main economic and financial challenge for LEDs is their high initial cost compared to alternative lighting options such as incandescent and CFL. To address this barrier, a strategy of bulk purchasing and distribution of LEDs with a low-interest or zero-interest repayment plan through billing could make the technology more accessible to consumers. This approach would allow consumers to afford LEDs without a significant upfront investment, using a portion of their energy savings to cover the cost over time.

During stakeholder consultations, it was observed that while the public is generally aware of LED technology and other energy-efficient technologies, there is a lack of understanding about how LEDs

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<sup>15</sup> <https://www.eaton.com/sg/en-us/company/news-insights/lighting-resource/trends/4-major-health-benefits-of-led-lighting.html>

can help reduce energy consumption and lower electricity bills. Therefore, public awareness campaigns are essential to educate the public about the benefits of LEDs compared to other lighting options.

Table 1.20 below provides a summary of the barriers identified for LED technology and the corresponding measures to overcome them.

**Table 1.20: Summary of Barriers and Measures to Overcome Barriers for LEDs**

Category	Identified Barriers	Measures to overcome barriers
Economic and Financial	High capital cost of the technology compared to other options available such as CFL and incandescent bulbs	<ul style="list-style-type: none"> <li>• LED Distribution Drive with a structured financial repayment system for customers</li> <li>• Develop and implement creative financing mechanisms and incentives to encourage the adoption of energy-efficient lighting and appliance technologies, including subsidies, revolving funds, etc.</li> <li>• Develop financial models that consider both the affordability and willingness to pay for selected energy-efficient lighting and appliances technologies</li> <li>• Arrange financial support or assistance for poor rural households at zero or low interest rates with an acceptable loan duration for them to acquire energy-efficient lighting and basic appliance technologies.</li> <li>• Prioritize market promotion over technology donation to ensure that beneficiaries recognize the significance of the technology.</li> <li>• Capitalize the Energy Fund and make it operational to provide financial support, capital subsidies, and production-based subsidies to investors, suppliers, dealers and consumers</li> <li>• Create easy access to affordable loans</li> </ul>
Technical	Low-quality and substandard equipment	<ul style="list-style-type: none"> <li>• Establish guidelines and regulations for energy-efficient lighting and appliances</li> </ul>
Weak legal, regulatory and institutional framework	Inadequate institutional framework	<ul style="list-style-type: none"> <li>• Quality standards should be approved and strictly enforced.</li> <li>• Strengthen the capacity of the private sector for self-regulation under the relevant umbrella associations</li> <li>• Create an enabling environment for private sector initiatives.</li> <li>• Need for legal framework to support the implementation of energy efficiency policies</li> <li>• Refinement of regulations to enhance public use</li> </ul>
Information and awareness	Inadequate and limited information sharing and public awareness about the technology	<ul style="list-style-type: none"> <li>• Enhance information dissemination through various channels such as print, electronic, and social media,</li> <li>• Cooperation between the Ministry of Energy and other relevant governmental institutions should be enhanced. Collaboration with other actors such as NGOs, donor organizations, and private entities should also be improved. The government should promote energy efficiency awareness-raising and training for government officials and the wider public at the local, regional, and national levels.</li> </ul>
Cultural, social and gender	Low participation of women in the sector.	<ul style="list-style-type: none"> <li>• Implement policies, initiatives and incentives to promote gender diversity in the energy industry</li> <li>• Set up scholarship program to incentivize the enrolment of women for gender mainstreaming</li> </ul>

### **Actions selected for inclusion in the TAP for Energy-Efficient Lighting and Appliance Technology**

This section provides a list of the measures selected as actions, along with narrative descriptions, that will be included in the TAP to increase the diffusion and penetration of efficient lighting and appliances (basic) applications in Lesotho. The most significant barriers were identified through stakeholders' consultations.

**Action 1: Creating a dedicated unit to coordinate** and oversee the implementation of the TAP initiatives is essential for the successful rollout of LEDs and other selected energy-efficient technologies in the country. This unit will be responsible for executing all actions and projects outlined in the TAP, providing technical coordination and project management. Additionally, it could be tasked with

developing a comprehensive national strategy focused on technology adoption and creating a market value chain.

- It is crucial that the unit is staffed with skilled personnel capable of developing terms of references (TORs) and scopes of work, and effectively carrying out the necessary actions and activities of the proposed projects.
- Given that several organizations have already carried out the same project, often with the same beneficiaries, it is important to have an organization that coordinates the activities to make the achievement of the project's goals more efficient. The Ministry of Environment and Forestry is suggested to take the lead in this initiative.

**Action 2: Promoting and encouraging the market** for LEDs and other selected energy-efficient appliances, rather than relying solely on technology donations is recommended: To ensure that beneficiaries appreciate the value of the technology, stakeholders strongly recommend offering them through co-financing options for low-income families. Instead of blanket technology donations, targeted subsidies and incentives can be provided to make LEDs and selected energy-efficient appliances more affordable for low-income households.

This approach ensures that resources are directed where they are most needed while still encouraging market development. Additionally, it should be made available to the general public who are interested in acquiring it but are not part of the identified beneficiaries.

By promoting the market for LEDs and energy-efficient appliances instead of solely relying on technology donations, a sustainable, economically viable, consumer-owned, and scalable solution can be achieved to address energy poverty, improve public health, and promote environmental sustainability. This approach aligns with sustainable development principles and empowers individuals and communities to pave their paths to prosperity. It encourages entrepreneurship, innovation, and collaboration, setting the foundation for long-term economic growth and social progress.

**Action 3: Enhance access to financing** through innovative and affordable financial strategies or business models. Establish and implement financial incentives for acquiring LEDs and energy-efficient technologies. Affordability has been highlighted as a major challenge by stakeholders for households and institutions. Many rural households and institutions require financial support to purchase LEDs and energy-efficient appliances, while local distributors are looking for innovative payment options for their customers to enhance affordability and ensure timely repayment. The Energy Fund should be made operational to provide loans to local distributors and individuals interested in acquiring selected energy-efficient technologies. This will help overcome a significant barrier to the adoption and used of energy energy-efficient technologies in both rural and urban areas where individuals have limited savings and lack access to conventional energy technologies.

**Action 4: Increase awareness campaigns and outreach** of LEDs and energy-efficient appliances by intensifying information dissemination, public education, and awareness campaigns for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements. This will help expand entrepreneurial activities, foster increased adoption of the technology, and equip users with essential information, such as costs and performance data.

- Currently, there is limited accessible information about new technologies that could help reduce electricity bills and lower GHG emissions, aligning with the government's focus on energy security. To enhance public awareness, the first crucial step is to create awareness materials in the local language for better understanding by the general public. These materials should be



developed and prepared for distribution through collaboration between the Ministry of Environment, Ministry of Energy and Ministry of Information. For long-term education, integrating energy efficiency and climate change into the school curriculum, particularly at the primary and secondary levels, should be led by the Ministry of Education with support from key agencies like the Ministry of Environment and Ministry of Energy.

**Action 5: Developing standards, building and strengthening institutional capacity:** Enhanced adoption of LEDs and energy-efficient technologies requires robust and well-coordinated institutions particularly for policy development and implementation, regulatory oversight, market development, monitoring and evaluation, coordination and collaboration.

All imported products, including energy-efficient products, are subject to import tax charges, which ultimately increase the prices of these products. It is important to review the existing import duty tax policy to consider the possibility of providing tax incentives for energy-efficient products, including household appliances.

**Action 6: Enhancing the local Market:** High levels of poverty in rural Lesotho, combined with limited access to clean energy sources, have resulted in a small market size and higher prices for LEDs and other energy-efficient appliances. To address this issue, a conducive environment for local investment in this technology should be established to attract potential investors, whether local or international, to manufacture LEDs and selected energy-efficient appliances at competitive prices that are affordable for the local population. The Ministries of Trade, Industry and Energy should play a key role in facilitating this process.

**Activities identified for implementation of selected actions**

For each of the actions described in the previous section, specific activities have been identified that must be carried out to comply with the measure. This section summarizes the identified actions into more specific activities. These activities are presented in the Table 1.21 below.

**Table 1.21: Activities identified for implementing selected actions for efficient lighting and appliances (basic)**

Action	Activity
<b>Action 1:</b> Create dedicated unit to coordinate and oversee implementation of the TAP initiatives within the Ministry of Environment and Forestry.	<ul style="list-style-type: none"> <li>Recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP</li> <li>Establish and equip the office of the PIU.</li> </ul>
<b>Action 2:</b> Promote and encourage the market for LEDs and other selected energy-efficient appliances, rather than relying solely on technology donations	<ul style="list-style-type: none"> <li>Engage a consultant to evaluate the technology costs and determine a suitable co-financing rate for families with low income.</li> </ul>
<b>Action 3: Enhance access to financing options</b> for LEDs and other selected energy-efficient technologies. Affordability is a key issue for households and institutions. Offering financial assistance and innovative payment options can help address this challenge.	<ul style="list-style-type: none"> <li><b>LED Distribution Drive:</b> This involves the bulk procurement of LED technologies and creating a mass distribution of the technology, as well as the development of a financial payback scheme for customers to ease the burden of the high initial cost.</li> <li>The Government should explore the option of implementing tax incentives for energy efficiency projects.</li> <li>DOE and MFDP should expedite the establishment of the Energy Fund and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire LEDs and other selected energy-efficient technologies.</li> <li>DOE and MFDP should provide innovative and affordable financial plans or business models for the purchase of LEDs and other selected energy-efficient technologies targeted at people in rural and urban areas.</li> </ul>
<b>Action 4: Increase public awareness of Energy and Cost Savings of LEDs and other energy-efficient technologies</b> through targeted awareness campaigns	<ul style="list-style-type: none"> <li>To ensure the success of the awareness campaign, a public relations team will need to be engaged to conduct a study of the target audience. This study will assist the team to</li> </ul>

using various media platforms to enhance adoption and knowledge among stakeholders.	<p>identify the appropriate media channels and messaging required for an effective campaign.</p> <ul style="list-style-type: none"> <li>• DOE need to enhance the dissemination of adequate information, public education, and awareness campaigns on LEDs and other energy-efficient technologies for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements.</li> <li>• LMS and DOE should set up information hubs or centres in each district to enhance awareness about the costs, benefits, and performance of LEDs and other energy-efficient technologies for local communities, financial institutions, cooperatives, and entrepreneurs.</li> </ul>
<b>Action 5: Build and Strengthen Institutional capacity:</b> Enhanced adoption of energy-efficient technologies requires strong and well-coordinated institutions	<ul style="list-style-type: none"> <li>• Special emphasis should be placed on importing energy-efficient equipment that meets specific quality standards. These standards must be approved and rigorously enforced.</li> </ul>
<b>Action 6: Promote</b> local market investment	<ul style="list-style-type: none"> <li>• Explore the potential for increasing private sector participation in technology development and local manufacturing of appliances to reduce costs and create employment opportunities for local residents.</li> </ul>

**Actions to be implemented as Project Ideas:** The actions to be implemented for the project idea on LEDs and other selected Energy-Efficient Technologies are outlined below.

**Project Idea 1: Enhance access to financing options** for LEDs and other selected energy-efficient technologies through innovative and affordable financial strategies or business models, establish and implement financial incentives. LED technology, like other energy-efficient technologies, faces economic and financial barriers as it is the most costly lighting option available, requiring a higher initial investment. Consequently, many consumers opt for the more affordable incandescent and CFL alternatives.

- One solution to this issue is to implement bulk buying and distribution of LEDs with a low-interest financial payback scheme through billing. This approach would enable consumers to afford the technology without needing to pay a higher upfront cost and use a portion of the savings for the payback.

**Activities:**

- Procurement of LEDs
- Create a payback business model
- Initiate, market, and publicize the LED Distribution Drive
- Distribution of LEDs
- Monitoring and updating the payback system
- By offering innovative financing options such as microloans, instalment plans, or pay-as-you-go models, the upfront cost becomes more manageable, making LEDs and other selected energy-efficient technologies accessible to a wider range of consumers.
- The Energy Fund should be made operational to lend to local distributors and individuals interested in acquiring LEDs and other selected energy-efficient technologies. This will facilitate the removal of a key stumbling block for the diffusion and deployment of LEDs and other selected energy-efficient technologies in both rural and urban areas where individuals have limited saving potential and no access to conventional energy technologies.
- **Provision of Subsidies:** The current cost of LEDs and other energy-efficient technologies is beyond the financial reach of the common man in rural areas. The Ministry of Energy, NGOs, development

partners, and the private sector will consider providing subsidies to poor households wishing to buy LEDs and other selected energy-efficient technologies in order to make them affordable.

- **Review taxing scheme on LEDs and other selected energy-efficient technologies:** Cabinet papers need to be prepared with a proposal for the relaxation of taxes on efficient cookstove components. The Ministry of Energy can request the assistance of the Ministry of Trade and Industry in the preparation of this document. This proposal will then be presented before the House of Representatives for approval and subsequent implementation.

**Project Idea 2: Increase public awareness of Energy and Cost Savings of LEDs and other energy-efficient technologies** through targeted awareness campaigns using various media platforms to enhance adoption and knowledge among stakeholders. In order to raise awareness among the general public, it is important to create awareness materials in the local language and distribute them through various media channels, including TV, radio, brochures, and other available platforms.

- To ensure the success of the awareness campaign, a public relations team will need to be engaged to conduct a study of the target audience. This study will assist the team to identify the appropriate media channels and messaging required for an effective campaign. During the development phase, a focus group session can be held to test the effectiveness of the materials being created. The campaign will then be executed based on the plan and evaluated to determine its effectiveness.

**Activities:**

- Collect information on the energy and cost savings associated with LED lighting in Lesotho
- Develop strategies for raising public awareness
- Organize and implement events and workshops
- Design promotional materials for dissemination to the public

**Gender issues:** Activities within a Technology Action Plan (TAP) aimed at increasing awareness and knowledge, as well as enhancing access to financing for clean efficient cookstoves, can significantly contribute to achieving gender outcomes:

**Targeted Outreach and Training:**

- Conducting targeted outreach programs aimed at women-led businesses to educate them about financing options available for energy-efficient upgrades like LED lighting.

**Promotion of Inclusive Financing Mechanisms:**

- Advocating for gender-responsive financing policies that consider the unique challenges and opportunities faced by women in accessing capital.

**Public Awareness Campaigns:**

- Developing targeted messaging in public awareness campaigns that resonate with women as decision-makers in households and businesses.

#### **1.1.4.4 Stakeholders and timeline for implementation of TAP**

**Overview of Stakeholders for the implementation of the TAP:** The successful implementation of the TAP will require the full cooperation of various key stakeholders. As the TNA project falls under the UNFCCC and the Ministry of Environment and Forestry serves as the Focal Point, the Ministry is the proponent of the project. The Ministry of Energy will be responsible for the on-the-ground implementation of the technology. Additionally, there will be other stakeholders involved in the process. Table 1.22 below provides a summary of the key stakeholders and their respective roles.

**Table 1.22: Roles of stakeholders involved in LEDs and energy-efficient Technology TAP**

Stakeholder	Action	Role
Ministry of Environment and Forestry (MEF)	1, 2, 3, 4, 5 and 6	<ul style="list-style-type: none"> <li>• The Ministry is the focal point for GEF and should explore other sources of funding to sustain the project.</li> <li>• Should organize key stakeholders' workshop to communicate about the project and the TAP in particular to get stakeholders buy-in.</li> <li>• Engage in providing advice to the MFDP during the formulation of the financial incentives policy.</li> <li>• Focal point of the UNFCCC will lead and provide information to support the development of the carbon financing market.</li> <li>• The primary entity involved in the procurement and distribution of the LEDs, and advertising and promotion of the program.</li> </ul>
Ministry of Energy (ME)	1, 2, 3, 4, 5 and 6	<ul style="list-style-type: none"> <li>• Promotes renewable energy technologies</li> <li>• Make policy amendments to Government to subsidize interest rates and set up a revolving fund</li> <li>• Manage the Energy Fund</li> <li>• <b>For action 3:</b> Review and finalize the draft procurement and payback system.</li> <li>• <b>For action 4:</b> Assist in creating the analysis of the data and developing the content to share with the public.</li> </ul>
Ministry of Finance and Development Planning (MFDP)	4	<ul style="list-style-type: none"> <li>• Develop and implement a policy on financial incentives to provide subsidies for interest rates on energy-efficient technologies.</li> <li>• Responsible for fiscal policies including incentives and subsidies</li> <li>• Negotiate loans for funding renewable energy projects</li> </ul>
Lesotho Electricity Company (LEC)	3, 4 and 5	<ul style="list-style-type: none"> <li>• Assist in the procurement and distribution of LEDs, playing a secondary role.</li> <li>• Contribute to the development of the payback system for customers and ensure it is monitored and updated as needed.</li> <li>• Support data collection and the creation of case studies for public sharing.</li> <li>• Help schedule workshops for the public to share findings and case studies.</li> <li>• Evaluate the public awareness program as the responsible entity.</li> </ul>
Ministry of Trade and Industry	3, 4 and 5	Quality control and assessment of the LED technology being procured
Development partners and funds: WB, AfDB, GIZ, EU, USAID, UNDP, UNEP, CTCN, UNFCCC, GEF, GCF	3, 4 and 5	Provide technical and financial support for diffusion of energy-efficient technologies
Non-Governmental Organizations (NGOs)	2, 3 and 4	Advocacy and Awareness; Capacity Building; Funding and Grants:
Women's Groups	2 and 4	Training and Leadership; Entrepreneurship and Local Solutions
Private Sector	2, 3 and 4	Investment and Financing; Market Development:

***Scheduling and sequencing of specific activities:*** The timeline for planning and implementing the LEDs and other selected energy-efficient technologies in TAP's actions and activities to establish a robust policy framework for deploying prioritized energy sector technologies spans six years (2024 to 2030). This timeframe is in line with the targets set out in Sustainable Development Goal 7, Lesotho's Revised Nationally Determined Contributions, and National Strategic Development Plan II (2023/24 – 2027/2028) (extension), which are crucial national policies addressing development priorities and climate change mitigation to achieve the country's energy sector objectives aligned with Sustainable Development Goal 7.

Table 1.23 below outlines the sequence and schedule of specific activities and responsibilities.

**Table 1.23: Sequence and schedule of specific activities and responsibilities**

Action	Activity and Responsibility Body	Years					
		1	2	3	4	5	6
<b>Action 1: Create dedicated unit to coordinate</b> and oversee implementation of the TAP initiatives within the Ministry of Environment and Forestry.	<ul style="list-style-type: none"> <li>DOE and MEF to recruit highly skilled personnel to develop a project implementation plan for the roll out of the TAP;</li> </ul>						
	<ul style="list-style-type: none"> <li>DOE, MEF and MFDP to establish and equip the office of the PIU.</li> </ul>						
<b>Action 2: Promote and encourage the market</b> for LEDs and other selected energy-efficient appliances, rather than relying solely on technology donations	<ul style="list-style-type: none"> <li>DOE and MEF to engage a consultant to evaluate the technology costs and determine a suitable co-financing rate for families with low income.</li> </ul>						
<b>Action 3: Enhance access to financing options</b> for LEDs and other selected energy-efficient technologies. Affordability is a key issue for households and institutions. Offering financial assistance and innovative payment options can help address this challenge.	<ul style="list-style-type: none"> <li><b>LED Distribution Drive:</b> This involves the bulk procurement of LED technologies and creating a mass distribution of the technology, as well as the development of a financial payback scheme for customers to ease the burden of the high initial cost.</li> <li>DOE and MFDP should expedite the establishment of the Energy Fund and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire LEDs and other selected energy-efficient technologies.</li> <li>DOE and MFDP should provide innovative and affordable financial plans or business models for the purchase of LEDs and other selected energy-efficient technologies targeted at people in rural and urban areas.</li> </ul>						
<b>Action 4: Increase public awareness of Energy and Cost Savings of LEDs and other energy-efficient technologies</b> through targeted awareness campaigns using various media platforms to enhance adoption and knowledge among stakeholders.	<ul style="list-style-type: none"> <li>To ensure the success of the awareness campaign, a public relations team will need to be engaged to conduct a study of the target audience. This study will assist the team to identify the appropriate media channels and messaging required for an effective campaign.</li> <li>DOE need to enhance the dissemination of adequate information, public education, and awareness campaigns on LEDs and other energy-efficient technologies for various stakeholders through print and electronic media, social media, seminars, workshops, conferences, and community engagements.</li> <li>LMS and DOE should set up information hubs or centres in each district to enhance awareness about the costs, benefits, and performance of LEDs and other energy-efficient technologies for local communities, financial institutions, cooperatives, and entrepreneurs</li> </ul>						
<b>Action 5: Build and Strengthen Institutional capacity:</b> Enhanced adoption of energy-efficient technologies requires strong and well-coordinated institutions	<ul style="list-style-type: none"> <li>DOE and MTI to prioritize the importation of energy-efficient equipment that meets specific quality standards. These standards must be approved and strictly enforced.</li> </ul>						
<b>Action 6: Promote</b> local market investment	<ul style="list-style-type: none"> <li>DOE, LEC, and MDFF to explore the possibility of boosting private sector involvement in technology development and domestic manufacturing of appliances to lower expenses and generate job opportunities for community members.</li> </ul>						

**Gender issues:** In developing TAP for the implementation of energy-efficient lighting and basic appliances, gender will be integrated into these aspects:

**Gender in Stakeholder Engagement:**

- Ensuring a diverse representation of stakeholders including women-led organizations, women entrepreneurs, gender-focused NGOs, and women in leadership roles within relevant government agencies, utilities, and businesses.
- Actively seek out perspectives from women consumers, particularly those in marginalized or underrepresented groups, to understand their specific needs and preferences regarding energy-efficient technologies.

**Gender Analysis of Actions and Activities:**

- Conduct a gender-sensitive needs assessment to understand how energy-efficient lighting and appliances impact women and men differently within households and businesses.
- Identify specific barriers that women face in accessing and adopting energy-efficient technologies, such as affordability, knowledge gaps, decision-making dynamics, and cultural norms.
- Integrate gender considerations into procurement processes and technical specifications to ensure that energy-efficient products meet the diverse needs of women consumers and businesses.
- Promote gender-balanced participation in outreach campaigns, awareness programs, and community engagement activities to maximize reach and impact.
- Establish gender-disaggregated indicators to track the participation and outcomes of women in the implementation of energy-efficient lighting and appliances.
- Foster an inclusive environment where women can contribute to decision-making processes and influence the direction of energy efficiency initiatives.

#### **1.1.4.5 Estimation of resources needed for action and activities**

**Estimation of capacity building needs:** In order to carry out the planned activities for implementing the technology, it is crucial to have access to human and material resources. It is important to enhance capacity in securing international funding and in training and certifying local personnel to facilitate the rapid adoption of the technology in the country.

**Human Resources:**

- Social science professionals with statistical knowledge for various studies.
- Trained facilitators to promote and support project initiatives.
- Finance and fund management specialists.
- Experts in credit and banking.
- Teamwork, budget management, and project management skills.

**Material Resources:**

- Financial support for organizing workshops, training sessions, and socialization activities.
- Vehicles for transporting professionals to facilitate nationwide socialization and capacity building.
- Funding for conducting workshops, training sessions, and socialization activities.

In particular, the capacity required for **Action 3** involves establishing a financial payback system and maintaining and revising it. This capacity is already available within the Ministry of Energy and its subsidiary LEC As a result, these stakeholders can carry out these activities without the need to bring in external resources.

**Estimations of costs of actions and activities:**

**Actions 1, 2, 5 and 6** are straightforward and relatively low-cost actions that can be implemented. The combined cost for these actions is estimated at USD 102 500. The resources needed to execute these actions are mostly available from stakeholders, so the costs would mainly be for the necessary products and services to accomplish them.

The estimated total cost for **Action 3** is approximately \$215 000, with the majority of the expenses allocated to the procurement of LEDs. The cost of the other activities is relatively low due to the minimal capacity required, and the expenses will mainly cover products, resources, and indirect services like media promotions.

**Action 4** is a straightforward and inexpensive step that can be easily implemented. The total cost for this action USD 60 000. Similar to Action 3, the majority of the necessary capacity to complete this action is already available from the stakeholders. Therefore, the cost would primarily be for products and services needed to carry out this action.

Table 1.24 below shows the human resources that would be needed for the completion of the activities.

**Table 1.24: Estimated Costs for Developing LEDs Initiatives**

Actions	Activities to be support	Estimated Costs (USD)
<b>Action 1: Create dedicated unit to coordinate</b> and oversee implementation of the TAP initiatives within the Ministry of Environment and Forestry.	<b>Activity 1.1:</b> Recruiting highly skilled personnel to develop a project implementation plan for the rollout of the TAP	22 500
	<b>Activity 1.2:</b> Establishing and equipping the office of the PIU	15 000
<b>Action 2: Promote and encourage the market</b> for LEDs and other selected energy-efficient appliances, rather than relying solely on technology donations	<b>Activity 2.1:</b> Hiring a consultant to assess technology expenses, establish an appropriate co-payment rate for low-income families	10 000
	<b>Activity 2.2:</b> Collaborating with retailers to market and distribute their technology products to the general public.	10 000
<b>Action 3: Enhance access to financing options</b> for LEDs and other selected energy-efficient technologies. Affordability is a key issue for households and institutions. Offering financial assistance and innovative payment options can help address this challenge.	<b>Activity 3.1:</b> Procuring LEDs directly from manufacturers or outsourcing the service through the private sector	90 000
	<b>Activity 3.2:</b> Business model development for payback	20 000
	<b>Activity 3.3:</b> Launch, advertise and promote LED Distribution Drive	15 000
	<b>Activity 3.4:</b> Distribution of LEDs	30 000
	<b>Activity 3.5:</b> Monitoring and Updating of Payback system	10 000
	<b>Activity 3.6:</b> Expedite the establishment of the <b>Energy Fund</b> and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire LEDs and other selected Energy-efficient Technologies	50 000
<b>Action 4: Increase public awareness of Energy and Cost Savings of LEDs and other energy-efficient technologies</b> through targeted awareness campaigns using various media platforms to enhance adoption and knowledge among stakeholders.	<b>Activity 4.1:</b> Gather data on LED energy and cost savings	15 000
	<b>Activity 4.2:</b> Create action plans for Public Awareness	10 000
	<b>Activity 4.3:</b> Schedule and Execute Events and Workshops	20 000
	<b>Activity 4.4:</b> Create advertising material for public sharing	5 000
	<b>Activity 4.5:</b> Evaluate Campaign	10 000
<b>Action 5: Build and Strengthen Institutional capacity:</b> Enhanced adoption of energy-efficient technologies requires strong and well-coordinated institutions	<b>Activity 5.0:</b> Emphasizing the importation of energy-efficient equipment that meets specific quality standards and ensuring compliance with these standards.	15 000

<b>Action 6: Promote</b> local market investment	Activity 6.0: Investigating opportunities to enhance private sector involvement in technology development and local manufacturing of appliances	30 000
<b>Total</b>		<b>367 500</b>

**Gender issues:** To ensure that capacity building is gender-responsive in the implementation of this TAP for enhancing access to financing options for LEDs and increasing public awareness of energy and cost savings, the following strategies will be implemented:

#### **Gender-Responsive Capacity Building:**

- **Tailored Training Programs:**
  - Develop training programs that address the specific needs and constraints faced by women in accessing financing and understanding the benefits of LED technology.
  - Include sessions on negotiation skills and advocacy to empower women to navigate the financing landscape effectively.
- **Mentorship and Networking Opportunities:**
  - Facilitate mentorship and networking opportunities that support women in building confidence, skills, and professional networks in the energy efficiency sector.
- **Access to Information and Resources:**
  - **Objective:** Ensure women have equal access to information, resources, and opportunities related to financing options and energy efficiency technologies.

#### **Gender Analysis of Budget Lines and Activities:**

- **Budget Allocation:**
  - Ensure equitable distribution of resources to support gender-responsive capacity building initiatives within the TAP.
- **Monitoring and Evaluation:**
  - Monitor the effectiveness of budget allocations in achieving gender equality outcomes and adjust as needed.

#### **1.1.4.6 Management planning**

**Risks and Contingency Planning:** Table 1.25 below outlines the risk and contingency plans for the implementation of the TAP for LED technology.

**Table 1.25: Risk and contingency Analysis for Risk and Contingency Analysis for LEDs**

Type of risk	Description	Contingency plan
Financial Risk	Insufficient funding for the large-scale acquisition of the technology.	Seek external funding from international development partners for the project.
Scheduling Risks	Delays in the procurement delivery and distribution of the LEDs to the public	Enforce a strict delivery timeframe from the supplier. Stay updated on the delivery progress and allocate additional personnel to help with deliveries in case of delays.
Performance Risks	The technology is not performing as expected.	Ensure that bidders during the procurement phase provide performance reviews and ratings of the technology being supplied. Additionally, make sure there is a performance warranty from the supplier. Compare the data collected to performance data.
Behavioural Risk	People are unwilling to switch from the	Collect data on the public's resistance to technology adoption. Use these data to develop strategies to encourage adoption among these



	technology they currently use.	individuals. The data can also inform the design and implementation of policy tools.
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**Next Steps:** Table 1.26 below shows the immediate requirements and next steps needed to initiate the activities for the implementation of the TAP for LED technology.

**Table 1.26: Immediate Requirements and Critical Steps for LEDs**

Immediate requirements	Critical steps
Access funding to purchase technology in bulk for the procurement phase.	<ul style="list-style-type: none"> <li>• Drafting the financial payback scheme and contract for public agreement</li> <li>• Developing a distribution plan for the technology</li> <li>• Implementing monitoring strategies for the distribution and payback systems</li> <li>• Ensuring that the technology being procured meets acceptable manufacturing standards</li> <li>• Monitoring and updating the payback financial system to ensure it is up to date</li> <li>• Evaluating the campaign to determine the outreach achieved.</li> </ul>

**Gender Issues:** In the implementation of the TAP for LEDs and energy-efficient technologies, gender issues will be recognized and addressed to promote fair outcomes and enhance the plan's impact.

**Identification of Gender Issues:**

- Conducting a thorough gender analysis at the outset of the planning phase to identify potential gender disparities, barriers, and opportunities related to LED adoption and energy-efficient technologies.
- Ensuring inclusive stakeholder consultations that actively seek input from women entrepreneurs, consumers, and professionals in the energy sector.
- Tailoring financing mechanisms to address barriers that disproportionately affect women, such as lack of collateral, limited access to information, and gender biases in financial institutions.
- Develop targeted outreach and awareness campaigns that resonate with women as key decision-makers in households and businesses.

**Mitigation Strategies:**

- Implementing gender-responsive capacity building programs that equip women with the skills and knowledge needed to participate in and benefit from energy-efficient technologies.
- Promote inclusive financing options that consider the unique financial constraints and opportunities of women entrepreneurs and households.
- Establishing gender-disaggregated indicators to monitor progress towards gender equality outcomes throughout the implementation of the TAP.

### 1.1.4.7 Reporting for LEDs

**Table 1.27: TAP overview table for LEDs**

TAP overview table								
<b>Sector</b>	Energy							
<b>Sub-sector</b>	Residential and Commercial							
<b>Technology</b>	LEDs (including Solar LED Lanterns) and Other Selected Energy-Efficient Appliances							
<b>Ambition</b>	<b>Distributing around 64 050 solar LED lamps to rural households by 2030 to replace the use of paraffin and candles for lighting. Providing about 50 000 LED bulbs to electrified homes, institutions, and businesses over a five-year period (2025 – 2030) to replace the use of ILBs and CFLs.</b>							
<b>Benefits</b>	Social		Improved Health; Time Savings; Safety					
	Economic:		Cost Savings; Income Generation; Local Economy					
	Environmental:		Reduced Fuel Consumption; Lower Emissions; Climate Change Mitigation					
<b>Action</b>	<b>Activities to be implemented</b>	<b>Sources of funding</b>	<b>Responsible body and focal point</b>	<b>Time frame</b>	<b>Risks</b>	<b>Success criteria</b>	<b>Indicators for Monitoring of implementation</b>	<b>Budget per activity</b>
<b>Action 3: Enhance access to financing options for LEDs and other selected energy-efficient technologies. Affordability is a key issue for households and institutions. Offering financial assistance and innovative payment options can help address this challenge</b>	Activity 3.1: Procuring LEDs directly from manufacturers or outsourcing the service through the private sector	GCF, GEF	Ministry of Energy, LEC, MEF, MTI	3	<ul style="list-style-type: none"> <li>• Delay in Procurement timeframe,</li> <li>• Damage during transport,</li> <li>• Theft,</li> <li>• Availability of safe storage?</li> </ul>	<ul style="list-style-type: none"> <li>• Bulk arrival of the LED technologies</li> <li>• Safe storage</li> </ul>	Procurement documents, customs clearance, delivery receipt and storage confirmation	90 000
	Activity 3.2: Business model development for payback	GoL	Ministry of Energy, LEC	2	Delay in finalizing mechanism	Financial mechanisms signed off and agreed upon	Signed and approved financial document to be shared with the public	20 000
	Activity 3.3: Launch, advertise and promote LED Distribution Drive	GCF, GEF	Ministry of Energy, LEC, MEF, MTI	1	Lack of interest from the public and other stakeholders	High public interest and other stakeholders	Development of communication plan.	15 000
	Activity 3.4: Distribution of LEDs	GCF, GEF	Ministry of Energy, LEC, MEF	6	<ul style="list-style-type: none"> <li>• Delays in distribution timeframe</li> <li>• Failure to deliver working bulbs</li> </ul>	Efficient distribution of LED lights to the public.	Number of LEDs distributed monthly	30 000
	Activity 3.5: Monitoring and Updating of Payback system	GoL	Ministry of Energy, LEC,	6	<ul style="list-style-type: none"> <li>• System update delay</li> <li>• Malfunctioning light bulbs</li> </ul>	System updated monthly on time.	Monthly report on repayment system	10 000
	<b>Activity 3.6:</b> Expedite the establishment of the <b>Energy Fund</b> and make it fully operational to provide loans with zero or low-interest rates and acceptable loan durations for poor rural households to acquire LEDs and other selected Energy-efficient Technologies	GoL, WB, AfDB, EU, GCF, GEF, USAID	Ministry of Energy, LEC, MFDP	2	Delay due to insufficient resources	<ul style="list-style-type: none"> <li>• Sufficient funds available to support LEDs and Energy-Efficient Technologies</li> <li>• Revolving loan fund established to support other</li> </ul>	<ul style="list-style-type: none"> <li>• Number of financial mechanisms from government and international partners available to make Energy Fund</li> <li>• Sustainable Number of loans provided by Fund</li> </ul>	50 000

						energy-efficient technologies		
<b>Action 4: Increase public awareness of Energy and Cost Savings of LEDs and other energy-efficient technologies through targeted awareness campaigns using various media platforms to enhance adoption and knowledge among stakeholders.</b>	Activity 4.1: Gather data on LED energy and cost savings	GoL	Ministry of Energy, LEC, MEF	5	Insufficient and inaccurate data collected	Sufficient data collected to share with the public regarding the efficiency of the technology	Average energy saved per household per month due to conversion to LED technology	15 000
	Activity 4.2: Create action plans for Public Awareness	GoL	Ministry of Energy, LEC, MEF	4	Action plans not aligned with campaign goals	Action plan aligned with the goals of the campaigns.	Accomplishments of each action plan:	10 000
	Activity 4.3: Schedule and Execute Events and Workshops	GoL	Ministry of Energy, LEC, MEF	1	Lacklustre stakeholder engagement with the event program and workshops.	High levels of stakeholder involvement and engagement High stakeholder participation and interest	Number of stakeholders attending events	20 000
	Activity 4.4: Create advertising material for public sharing	GoL	Ministry of Energy, LEC,	1	Insufficient data was provided to the citizens	Ads have been created to help the public gain a better understanding of the technology.	Increased diffusion of the technology	5 000
	Activity 4.5: Evaluate Campaign	GoL	Ministry of Energy, LEC, MEF	1	Insufficient feedback data for accurate analysis.	Feedback and understanding from the public regarding information shared	Post-workshop reports and event surveys	10 000

**Gender issues:** Gender considerations will be integrated into the reporting of TAP project ideas to ensure that initiatives are gender-responsive and promote equitable outcomes.

- **Gender Analysis Requirement:** Making it a requirement for project proposers to conduct a gender analysis as part of their project idea reporting.
- **Gender-Sensitive Criteria:** Creating evaluation criteria that consider gender perspectives when assessing TAP project ideas.
- **Inclusive Stakeholder Engagement:** Encouraging project proposers to engage with diverse gender groups throughout the project ideation and reporting process.
- **Gender-Disaggregated Data Collection:** Mandating that project proposers to gather and report gender-disaggregated data on project impacts, outcomes, and beneficiaries.
- **Capacity Building:** Offering capacity-building support to project proposers on gender mainstreaming and gender-responsive project design.
- **Peer Review and Feedback:** Establishing mechanisms for peer review and feedback on project ideas, including gender experts or reviewers with expertise in gender mainstreaming.
- **Monitoring and Reporting Requirements:** Including specific requirements for monitoring and reporting on gender-related indicators and outcomes throughout the project lifecycle.

#### 1.1.4.8 Tracking the implementation status of the TAP

*Rationale, responsibility and content of TAP tracking:* Developing a national system to monitor the progress of LEDs and energy-efficient Technology Action Plans in Lesotho will necessitate a structured strategy that engages various stakeholders and assigns specific institutional roles:

- **Establishment of a Coordination Mechanism:**
  - Designating a lead government agency or coordinating body responsible for coordinating and overseeing the implementation and tracking of LEDs and other selected Energy-Efficient Technology TAP Lesotho. This could be the Ministry of Environment and Environment or Ministry of Energy. *It will have the authority and capability to collaborate with relevant ministries, departments, NGOs, and other stakeholders involved in TAP implementation.*
- **Development of Monitoring Framework:**
  - Developing a comprehensive monitoring and evaluation framework for tracking the implementation of LEDs and other selected energy-efficient technology TAPs. *This framework will outline the objectives, indicators, targets, data sources, and reporting mechanisms for monitoring progress and assessing the impact of TAP interventions.*
- **Institutional Responsibilities:**
  - Assigning specific institutional responsibilities to relevant government agencies, departments, and stakeholders involved in TAP implementation. Responsibilities may include:
    - Ministry of Health: Responsible for monitoring health impacts and promoting awareness of health benefits associated with LEDs and other energy-efficient technologies.
    - NGOs and Civil Society Organizations: Responsible for community outreach, capacity building, and advocacy on LEDs and other energy-efficient technologies.
    - Research Institutions: Responsible for conducting studies, surveys, and impact assessments to inform TAP implementation and policy decisions.

- **Timing and Reporting Requirements:**

- **Baseline Assessment:** Conducting a comprehensive baseline assessment to understand the current usage of cookstoves, energy sources, and associated health and environmental impacts. This will be done before the initiation of the TAP.
- Establishing regular reporting cycles for monitoring progress on TAP implementation. This may include quarterly, biannual or annual reporting periods, depending on the timeframe and scope of TAP activities.
- Requiring participating agencies and stakeholders to submit progress reports on their TAP activities, detailing achievements, challenges, lessons learned, and future plans: *Reports should be standardized and submitted to the lead agency or coordinating body overseeing TAP implementation.*
- Conducting periodic review meetings or workshops involving relevant stakeholders to discuss progress, share best practices, and address challenges encountered during TAP implementation.

- **Information to be Tracked:**

- Tracking KPIs related to TAP objectives, such as:
- Number of LEDs and other selected energy-efficient technologies distributed.
- Percentage of households adopting LEDs and other selected energy-efficient technologies:
- Tracking the number of households or communities adopting LEDs and other selected energy-efficient technologies compared to the total target population.
- Socio-economic impacts on women's empowerment, income generation, and time savings.
- **User Satisfaction:** Gather feedback from households using LEDs and other selected energy-efficient technologies to understand user satisfaction, usability, and any challenges faced.
- Monitoring budget expenditures, resource allocation, and funding gaps to ensure efficient use of financial resources and identify areas for additional support or investment: *Track the allocation and utilization of funds allocated for the TAP, ensuring transparency and accountability.*

**Gender Issues:** Incorporating gender-specific criteria and targets into the reporting process for LEDs and other chosen energy-efficient technologies implementation will be crucial to ensure that gender considerations are properly addressed and progress towards gender equality is monitored.

- **Gender-Disaggregated Data Collection:**

- Requiring the collection of gender-disaggregated data on various indicators related to TAP implementation. This data should include information on the number of men, women, and other gender groups reached by TAP activities, as well as their participation rates, preferences, and outcomes.

- **Gender-Responsive Indicators:**

- Developing gender-responsive indicators to assess the impact of TAP interventions on gender equality and women's empowerment. These indicators may include:
  1. Percentage of women involved in decision-making processes.

- **Gender Mainstreaming Targets:**

- Setting specific targets for gender mainstreaming within TAP implementation activities. These targets should reflect the commitment to promoting gender equality and women's empowerment throughout the TAP lifecycle. Examples of targets may include:
  - a) Ensuring that at least 50% of beneficiaries reached are women.
  - b) Increasing women's participation in leadership roles within TAP implementation committees or working groups to at least 30%.
  - c) Providing gender-sensitive training and capacity-building opportunities to women entrepreneurs or community leaders involved in promoting the technology.
- **Gender Analysis and Reporting:**
  - Requiring project implementers to conduct gender analyses and report on gender-specific considerations, challenges, and opportunities encountered during TAP implementation.
  - Encourage project implementers to share case studies, success stories, and lessons learned on gender-responsive approaches to energy-efficient technology promotion and adoption.
- **Stakeholder Engagement and Consultation:**
  - Ensuring meaningful engagement and consultation with women, men, and other gender-diverse stakeholders throughout the TAP implementation process. Seek input and feedback from diverse gender groups to inform decision-making, program design, and reporting.
- **Capacity Building on Gender Mainstreaming:**
  - Providing training and capacity-building support to project implementers and stakeholders on gender mainstreaming and gender-responsive reporting. Offer guidance on how to integrate gender considerations into program planning, monitoring, and evaluation processes.

## 1.2 Project Ideas for the Energy Sector

### 1.2.1 Brief summary of the Project Ideas for the Energy Sector

According to Lesotho's extended second National Strategic Development Plan (NSDP II), access to reliable clean energy is still low due to overreliance on biomass sources in the energy mix, constrained electricity generation, transmission, and distribution infrastructure, limited productive use of energy, long lead time of energy projects, low levels of energy efficiency, and uncoordinated intra and inter-sectoral planning. As a contribution to increased access to reliable clean energy, three Project Ideas have been proposed for the Energy Sector for implementation of the country's Technology Action Plan. These are:

- 1) Accelerated uptake of Solar PV Minigrid systems through the provision of financial incentives
- 2) Increased access to clean cooking through the promotion of Efficient Cookstoves using targeted financial incentives and increased awareness-raising campaigns
- 3) Scaling up diffusion of Energy-Efficient Lighting and Appliances for residential and commercial use through targeted financial incentives and increased awareness-raising campaigns.

#### **Accelerated Uptake of Solar PV Minigrid Systems:**

- **Objective:** Increase adoption of solar PV minigrid systems in rural and underserved areas.

- **Background:** Lesotho faces challenges in electricity generation and distribution infrastructure, leading to low access to clean energy. The project aims to overcome these barriers by providing financial incentives to accelerate the deployment of solar PV minigrids.
- **Activities:** Offer subsidies or grants to communities and businesses for installing solar PV minigrids. Conduct awareness campaigns to educate stakeholders about the benefits and opportunities of solar energy.
- **Expected Outcomes:** **CO<sub>2</sub> emissions avoidance from reduced use of kerosene for lighting and biomass for cooking**, expanded access to reliable electricity, reduced reliance on biomass, enhanced local economic development, and strengthened resilience against power shortages.

#### **Increased Access to Clean Cooking Through Efficient Cookstoves:**

- **Objective:** Promote the adoption of efficient cookstoves to replace traditional biomass cooking methods.
- **Background:** The overreliance on biomass for cooking in Lesotho contributes to indoor air pollution and deforestation. This project aims to mitigate these impacts by incentivizing the use of efficient cookstoves.
- **Activities:** Provide targeted financial incentives for purchasing efficient cookstoves. Conduct awareness-raising campaigns to educate households on the benefits of clean cooking technologies.
- **Expected Outcomes:** **CO<sub>2</sub> emissions avoidance from reduced use of kerosene and biomass for cooking**, improved indoor air quality, reduced environmental degradation, and enhanced health outcomes for households.

#### **Scaling Up Diffusion of Energy-Efficient Lighting and Appliances:**

- **Objective:** Increase adoption of energy-efficient lighting and appliances in residential and commercial sectors.
- **Background:** Low levels of energy efficiency contribute to high energy consumption and costs in Lesotho. This project aims to address these issues by promoting the use of energy-efficient technologies.
- **Activities:** Offer financial incentives such as rebates or subsidies for purchasing energy-efficient lighting and appliances. Conduct awareness campaigns to educate consumers and businesses on the benefits of energy conservation.
- **Expected Outcomes:** Reduced energy consumption, lower electricity bills for consumers, and reduced strain on the national power grid, indirect reduction in GHG emissions associated with electricity imports.

These projects are designed to align with Lesotho's NSDP II by targeting key challenges such as limited access to clean energy, inefficient energy use and overreliance on traditional biomass. By incentivizing the adoption of solar PV minigrids, efficient cookstoves and energy-efficient technologies, the projects aim to promote sustainable development, improve energy access, enhance overall socio-economic conditions in Lesotho, while addressing the climate change.

### **1.2.2 Project Idea I: Efficient Cookstoves Technology**

**Specific Project Idea I:** Increased access to clean cooking through the promotion of Efficient Cookstoves.

**Table 1.28: Specific Project Idea for Efficient Cookstoves**

Sector	Energy
<b>Subsector</b>	<b>Residential and Institutional</b>
<b>Technology Name</b>	<b>Efficient Cookstoves</b>
Project Name	Increased access to clean cooking through the promotion of Efficient Cookstoves
Introduction / Background	<p>Traditional biomass stoves often burn wood or charcoal inefficiently, releasing large amounts of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). Efficient cookstoves burn fuel more completely, producing fewer emissions. By using less fuel to achieve the same level of cooking, efficient cookstoves decrease the demand for firewood, reducing pressure on forests and lowering associated carbon emissions from deforestation.</p> <p>Access to clean cooking solutions is a pressing issue in Lesotho, where a significant portion of the population relies on traditional biomass for cooking. This reliance contributes to indoor air pollution, deforestation and adverse health impacts, particularly affecting women and children. Transitioning to efficient cookstoves presents an opportunity to improve livelihoods, health outcomes, and environmental sustainability. Women and children are at a higher risk because mothers often have their children nearby while cooking due to a lack of child-care assistance in households that still use traditional biomass for cooking. Many are unaware that the smoke from these stoves can cause illnesses, yet they continue to use them because they are seen as more affordable. Household air pollution (HAP) is a significant risk factor for non-communicable diseases (NCDs) in poor rural families in Lesotho. While the connection between HAP and chronic lung disease and lung cancer is well-known, evidence linking it to cardiovascular disease is still limited. The adoption of clean cooking solutions is hindered by factors such as affordability, consumer preferences, and a lack of understanding of the health and environmental benefits. Merely providing access to clean energy fuels and technology does not guarantee their use, as cooking practices are deeply ingrained in household culture.</p>
Objectives	<p><b>Primary Objective:</b> The main objective of this project idea is to promote the widespread adoption and use of efficient cookstoves among rural and peri-urban households in Lesotho. By transitioning to efficient cookstoves, the project aims to cut down GHG emissions associated with traditional biomass cooking.</p> <p><b>Secondary Objectives:</b></p> <ul style="list-style-type: none"> <li>• Improve indoor air quality and reduce respiratory diseases.</li> <li>• Mitigate deforestation, environmental degradation and promote sustainable use of biomass resources.</li> <li>• Empower local communities through training and capacity building.</li> <li>• Enhance economic opportunities for local stove manufacturers and distributors.</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Conduct a baseline survey to assess current cooking practices and fuel consumption.</li> <li>• Distribute efficient cookstoves to 50% households in targeted communities.</li> <li>• Provide training on the use, maintenance, and benefits of efficient cookstoves.</li> <li>• Monitor and evaluate the impact on air quality, fuel savings, and community satisfaction.</li> </ul>
Relationship to the country's Sustainable Development Priorities	<ul style="list-style-type: none"> <li>• Aligns with Lesotho's NSDP goals related to sustainable energy access, health improvement, and environmental conservation.</li> <li>• Supports Lesotho's commitments to achieve Sustainable Development Goals (SDGs), including SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).</li> <li>• The National Energy Policy 2015 promotes access to modern energy for households and aims to eradicate energy poverty. Deployment of efficient cookstoves is one way to contribute to meeting these national priorities.</li> </ul>
Project Deliverables	<ul style="list-style-type: none"> <li>• Baseline survey report on cooking practices and fuel consumption.</li> <li>• Distribution of efficient cookstoves and installation in targeted households.</li> <li>• Training materials and sessions conducted for stove beneficiaries.</li> <li>• Monitoring and evaluation report on stove performance, fuel savings, and community feedback.</li> </ul>
Project Scope and Possible Implementation	<p><b>Geographical Focus:</b> Initially target rural communities in 5 mountainous districts (Mokhotlong, Thaba-Tseka, Qacha's Nek, Quthing and Mohale's Hoek).</p> <p><b>Implementation Strategy:</b> Collaborate with local NGOs, government agencies, and stove manufacturers for distribution and training.</p> <ol style="list-style-type: none"> <li>1. <b>Stakeholder Engagement:</b> Engage community leaders, women's groups, and local businesses in project activities and awareness campaigns.</li> <li>2. <b>Preparation Phase (Months 1-4):</b> <ul style="list-style-type: none"> <li>○ Conduct stakeholder consultations.</li> <li>○ Finalize project design and budget.</li> </ul> </li> <li>3. <b>Implementation Phase (Months 3-24):</b> <ul style="list-style-type: none"> <li>○ Procure efficient cook stoves.</li> <li>○ Distribute stoves and conduct training sessions.</li> <li>○ Monitor stove usage and collect feedback.</li> </ul> </li> </ol>



	<p><b>4. Evaluation Phase (Months 12-30):</b></p> <ul style="list-style-type: none"> <li>○ Assess impact on air quality and fuel savings.</li> <li>○ Prepare final project report with recommendations for scaling.</li> </ul>
Project Activities	<p><b>Preparation Phase (Months 1-4):</b></p> <ul style="list-style-type: none"> <li>● Conduct stakeholder consultations and baseline survey.</li> <li>● Finalize project design, budget, and procurement plan.</li> </ul> <p><b>Implementation Phase (Months 3-24):</b></p> <ul style="list-style-type: none"> <li>● Procure efficient cookstoves and necessary equipment.</li> <li>● Distribute cookstoves to households and conduct installation</li> <li>● Conduct training sessions on stove usage, maintenance, and</li> </ul> <p><b>Evaluation Phase (Months 12-30):</b></p> <ul style="list-style-type: none"> <li>● Monitor stove usage and collect data on fuel savings and air quality improvements.</li> <li>● Evaluate project impact and prepare final report with recommendations for scaling up.</li> </ul>
Timelines	The project is expected to be implemented over a period of 30 months, with specific milestones and deadlines outlined in the project timeline.
Budget / Resource Requirements	<p><b>Estimated Budget:</b> USD 1 000 000</p> <ul style="list-style-type: none"> <li>● Engaging stakeholders to collect information for creating the policy on proposed financial incentives</li> <li>● Policy creation and execution</li> <li>● Consulting to analyse and advise MFDP on subsidy financial impacts</li> <li>● Implementing the subsidy through FIs by reducing loan rates</li> <li>● Establishing a secretariat for a revolving fund</li> <li>● Submitting proposals to DPs for funding the RE fund</li> <li>● Creating awareness materials and team for sensitization.</li> </ul> <p><b>Funding Sources:</b> Seek funding from international donors, government grants and partnerships with private sector entities.</p>
Measurement / Evaluation	The project will be evaluated based on key performance indicators such as increased adoption rates of efficient cookstoves, reduction in fuel consumption, and improved indoor air quality and community feedback on health improvements.
Complications / Challenges	Potential complications and challenges include resistance to change from traditional cooking methods, limited funding, logistical constraints, difficulty distributing in remote areas, and ensuring sustained stove maintenance and usage.
Responsibilities and Coordination	<p><b>Lead Organization:</b> Ministry of Energy</p> <p><b>Collaborating Partners:</b> Local NGOs, government departments, stove manufacturers, and community leaders.</p> <p><b>Coordination:</b> Regular coordination meetings and reporting mechanisms to ensure smooth implementation and address challenges promptly</p>

### 1.2.3 Project Idea II: Solar PV Minigrid Systems Technology

**Specific Project Idea II:** Construction of a 100-kW solar PV mini-grid power plant and clean water system for the Linakaneng Community Council in the Mokhotlong district of Lesotho.

**Table 1.29: Construction of a 100-kW solar PV mini-grid power plant and clean water system for Linakaneng Community Council in Mokhotlong district, Lesotho**

Sector	Energy
Subsector	Electricity
Technology name	Solar PV mini-grid
Project name	Construction of 100 kW solar PV minigrid power plant and clean water system for Linakaneng Community Council, in Mokhotlong district, Lesotho
Introduction/ Background	<p>The Linakaneng Community Council in the Mokhotlong district of Lesotho lacks access to reliable electricity and clean water. This project aims to address these challenges by constructing a 100-kW solar PV mini-grid power plant and a clean water system for the community.</p> <ul style="list-style-type: none"> <li>● Households in Linakaneng, like in most rural areas in the country, primarily rely on biomass (fuelwood, agricultural residues, and dung) for their energy needs, with coal and kerosene making up a small portion of total domestic energy consumption. The majority of households use candles and paraffin for lighting, which are easily accessible from spaza shops and general dealers in the community.</li> <li>● Spaza shops typically rely on dry cell batteries to power a radio that runs all day. Grain/maize mills operate on diesel, while taverns use a diesel generator and SHS for</li> </ul>

	<p>electricity to run a sound system and a refrigerator. Due to the high costs associated with small generators, few businesses use them regularly. Tavern fridges are sometimes powered by the generator but are more commonly filled with purchased ice from Thaba-Tseka. Generators are only used on weekends due to operating costs, while SHSs are used during the week. Businesses struggle to be profitable due to high fuel costs and the need for generator maintenance and spare parts.</p> <ul style="list-style-type: none"> <li>• The health centre is powered by a diesel generator and solar system, primarily used for medical equipment, vaccine freezers, a TV, and a microscope. The clinic faces challenges with high fuel costs for the generator. Fresh water is sourced from a borehole with a solar pump, supplemented by alternative sources on days with insufficient solar power. Reliable electricity is crucial for proper rural health services.</li> <li>• The telecommunication transceiver station in the village operates on a hybrid system with a diesel generator and solar PV system.</li> </ul>
Objectives	<ul style="list-style-type: none"> <li>• Mitigate climate change: Many rural areas in Lesotho lack access to electricity, forcing residents to rely on polluting fuels like paraffin for lighting and cooking. Solar mini-grid will bring clean, reliable electricity to these underserved communities for the first time</li> <li>• Reduce reliance on diesel fuel for electricity: Solar PV mini-grid can replace diesel generators, reducing air pollution and GHG emissions for cleaner air and better public health.</li> <li>• <b>Provide reliable electricity</b> to the Linakaneng Community Council by installing a 100-kW solar PV mini-grid power plant.</li> <li>• <b>Ensure access to clean water</b> for the community through the construction of a clean water system.</li> <li>• <b>Sustainable Development:</b> Improve living standards, support economic activities, and reduce environmental impact through renewable energy and water infrastructure.</li> <li>• Showcase the effectiveness of solar PV mini-grid system in enhancing energy security, air quality, and the well-being of local communities, as well as advancing the development of sustainable renewable energy technologies.</li> <li>• Encourage the adoption of clean, eco-friendly renewable energy technology.</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Reduction of GHG emissions and other pollutants, such as particulates, sulphur dioxide, and nitrogen oxides, resulting from fossil fuel power generation in Lesotho</li> <li>• Installation and operationalization of a 100 kW solar PV minigrig power plant.</li> <li>• Construction of a clean water system to provide access to clean water for the community.</li> <li>• Enhanced quality of life through improved access to electricity and water.</li> <li>• Training for community members on the maintenance and operation of the solar PV mini-grid power plant and clean water system.</li> <li>• Redirecting financial resources previously used for diesel towards other healthcare needs, and other necessities</li> <li>• Creating job opportunities for local residents, and entrepreneurial opportunities for women</li> <li>• Enhancing the storage of medicine and vaccines</li> <li>• Improving the delivery of healthcare services, including night services</li> <li>• Reduction of Lesotho's dependence on imported fossil fuels for electricity generation</li> <li>• Improved lighting for communal facilities such as schools, town halls, health centres, and public offices</li> </ul>
Relationship to the country's sustainable development priorities	<p>This project aligns with Lesotho's sustainable development priorities by promoting</p> <ul style="list-style-type: none"> <li>• <b>Energy Access,</b></li> <li>• <b>Clean Water and Sanitation,</b></li> <li>• <b>Environmental Sustainability,</b></li> <li>• <b>Social and Economic Development,</b></li> </ul> <p>Solar PV mini grid systems are essential in Lesotho's efforts to reduce GHG emissions, which is a key component of the country's current national sustainable development goals outlined in the following documents:</p> <ul style="list-style-type: none"> <li>• National Energy Policy (NEP, 2015)</li> <li>• Nationally Determined Contribution (NDC, 2024)</li> <li>• Electrification Master Plan (EMP, 2018)</li> </ul>

	<ul style="list-style-type: none"> <li>• National Climate Change Policy Implementation Strategy (CCPIS, 2017)</li> </ul>
Project Deliverable	<ul style="list-style-type: none"> <li>• Solar PV minigrid and water system design and engineering plans.</li> <li>• Procurement and installation of solar panels, inverters, batteries, and water purification equipment.</li> <li>• Training programs for community members on maintenance and operation.</li> <li>• Monitoring and evaluation reports on energy generation, water quality, and community impact.</li> <li>• Construction of the solar PV mini-grid power plant is completed.</li> <li>• Operational clean water system.</li> <li>• Community members trained on maintenance and operation.</li> <li>• Reductions in GHG emissions</li> <li>• Jobs opportunities created for the local community during construction and operation of the project.</li> <li>• Contribution to the growth of the local economy by creating new market opportunities for local produce, increasing trade, and improving road infrastructure in the project area.</li> </ul>
Project Scope and Possible Implementation	<p>The project will cover the Linakaneng Community Council in Mokhotlong district, focusing on providing electricity through solar power and clean water through a reliable water system. It will entail the planning, acquisition, and setup of a solar PV mini-grid power plant and clean water system. The project will require cooperation with local officials, NGOs, and technical specialists to ensure successful project implementation.</p>
Project Activities	<ul style="list-style-type: none"> <li>• Introduction of the project to Linakaneng Community and signing of the related MOU.</li> <li>• Securing funding for the implementation of the project.</li> <li>• Conducting a detailed audit of existing energy needs and an environmental impact assessment of the project site.</li> <li>• Developing the technical design of a solar PV minigrid system with battery storage.</li> <li>• Procuring equipment and materials</li> <li>• Drilling boreholes, installing water pumps, and connecting them to the solar PV minigrid system.</li> <li>• Training technicians to operate and maintain the solar PV minigrid system.</li> <li>• Monitoring the performance of the installed systems.</li> <li>• Allocating annual funds for the operation and maintenance of the Solar PV Minigrid system.</li> <li>• Monitor performance and conduct regular maintenance.</li> </ul>
Timelines	<p>The project is expected to be implemented over a period of 24 months, with specific milestones and deadlines outlined in the project timeline.</p> <ul style="list-style-type: none"> <li>• <b>Preparation Phase</b> 6 months: Feasibility studies, design, and procurement</li> <li>• <b>Installation and Construction Phase</b> 18 months: Installation of solar PV minigrid and water system.</li> <li>• <b>Training:</b> 1 month</li> <li>• <b>Commissioning and Operational Phase:</b> Ongoing with regular monitoring and maintenance</li> </ul>
Budget / Resource requirements	<p>The project will require funding for materials, equipment, labour, training and maintenance. <i>A detailed budget will be developed based on the project scope and activities.</i> The total cost for installing the Solar PV minigrid systems, drilling the boreholes, and installing the water pumps was estimated at USD 250 000.</p> <ul style="list-style-type: none"> <li>• <b>Initial Investment [USD 200 000]:</b> Procurement of solar PV equipment, water purification systems, construction materials, and labour costs.</li> <li>• <b>Ongoing Costs [USD 50 00 annually]:</b> Maintenance, operation, training, and community outreach.</li> </ul>
Measurement / Evaluation	<p>The success of the project will be measured by the operational efficiency of the solar PV mini-grid power plant and clean water system, as well as the impact on the community's quality of life.</p> <ul style="list-style-type: none"> <li>• Energy output from the solar PV minigrid.</li> <li>• Water quality and quantity delivered by the clean water system.</li> <li>• Impact on community health, economic activities, and environment.</li> <li>• Feedback and satisfaction surveys from community members</li> </ul>

Complications / Challenges	<ul style="list-style-type: none"> <li>• <b>Logistical Challenges:</b> Remote location, infrastructure constraints, harsh weather conditions, and challenges in procuring land parcels.</li> <li>• <b>Financial Sustainability:</b> Securing funding for initial investment and ongoing maintenance.</li> <li>• <b>Community Engagement:</b> opposition from the community, ensuring local buy-in and participation throughout project phases.</li> </ul>
Responsibilities and Coordination	<p><b>Project Lead [Department of Energy]:</b> Overall project management and coordination.</p> <p><b>Partners:</b> Local government, NGOs, technical experts, and community leaders for support and collaboration.</p> <p><b>Community:</b> Active involvement in project planning, implementation, and maintenance.</p>

### 1.2.4 Project Idea III: Energy-Efficient Lighting and Appliances

**Specific Project Idea III:** Distribution of 64 050 solar LED lamps to rural households by 2030 to replace the use of paraffin and candles for lighting, and provision of 50 000 LED bulbs to electrified homes, institutions, and businesses over a five-year period to replace the use of ILBs and CFLs.

**Table 1.30:** Distribute 64 050 solar LED lamps to rural households by 2030 to replace paraffin and candles for lighting, and Provide 50 000 LED bulbs to electrified homes, institutions, and businesses over five years to replace ILBs and CFLs.

<b>Sector</b>	<b>Energy</b>
<b>Subsector</b>	<b>Residential and Commercial</b>
<b>Technology Name</b>	<b>LEDs and other selected Energy-Efficient Appliances</b>
Project Name	Distribution of 64 050 solar LED lamps to rural households by 2030 to replace the use of paraffin and candles for lighting, and provision of 50 000 LED bulbs to electrified homes, institutions, and businesses over a two-year period to replace the use of ILBs and CFLs.
Introduction / Background	<p>Access to reliable and clean lighting is crucial for socio-economic development. Lesotho faces challenges in providing reliable and sustainable lighting solutions, particularly in rural areas where households rely on paraffin and candles, and in electrified locations where inefficient ILBs and CFLs are prevalent. This project aims to replace these traditional lighting sources with solar LED lamps and energy-efficient LED bulbs, thereby improving lighting quality, reducing indoor air pollution, and promoting sustainable energy practices.</p> <p>The project aims to distribute 64 050 solar LED lamps to rural households by 2030, replacing the use of paraffin and candles for lighting. Additionally, 50 000 LED bulbs will be provided to electrified homes, institutions, and businesses over a two-year period to replace ILBs and CFLs. The electricity efficiency in the residential and commercial sectors remains low. A key technology priority for these sectors is the promotion of energy-efficient LEDs to replace CFLs and inefficient ILBs. LEDs offer the same level of brightness as incandescent bulbs but consume about 90% less electricity. While LEDs may have a higher upfront cost compared to ILBs, they are more cost-effective in the long run due to savings in electricity expenses. Presently, the majority of households and approximately 30% of service and commercial buildings utilize incandescent bulbs, with the remainder using fluorescent bulbs.</p>
Objectives	<p><b>Primary Goal: Climate Change Mitigation</b></p> <ul style="list-style-type: none"> <li>• Reduced electricity consumption by 20-30% in residential and commercial sectors, leading to indirect GHG emission reductions from electricity imports and supporting Lesotho's climate change mitigation goals.</li> <li>• Reduce reliance on polluting and inefficient lighting sources (paraffin, candles, ILBs, CFLs) in rural areas and electrified locations.</li> <li>• Replace traditional lighting sources with energy-efficient solar LED lamps and bulbs</li> <li>• Improve access to sustainable lighting solutions in rural areas</li> <li>• Improve energy efficiency, reduce carbon footprint, and enhance lighting quality in target communities, promote the reduction of electricity consumption for lighting, reduce the peak demand on the central grid.</li> </ul> <p><b>Secondary Goals:</b></p>

	<ul style="list-style-type: none"> <li>• Replace paraffin and candles with 64 050 solar LED lamps in rural households by 2030.</li> <li>• Provide 50 000 LED bulbs to electrified homes, institutions, and businesses over a two-year period to replace ILBs and CFLs.</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Distribution of 64 050 solar LED lamps.</li> <li>• Provision of 50 000 LED bulbs to electrified locations.</li> <li>• Reduction in reliance on paraffin, candles, ILBs, and CFLs.</li> <li>• Increased awareness of energy-efficient lighting solutions.</li> </ul>
Relationship to the country's Sustainable Development Priorities	<p>The project aligns with Lesotho's sustainable development priorities by promoting energy efficiency, reducing reliance on traditional lighting sources, and improving access to clean and sustainable energy solutions.</p> <ul style="list-style-type: none"> <li>• <b>Energy Access:</b> Improving access to clean and sustainable energy sources.</li> <li>• <b>Environmental Sustainability:</b> Reducing carbon emissions and indoor air pollution.</li> <li>• <b>Social Inclusion:</b> Enhancing living conditions and economic opportunities in rural communities.</li> <li>• <b>Education:</b> Improving study conditions for students through better lighting.</li> <li>• Increase the disposable income of residents.</li> </ul>
Project Deliverables	<ul style="list-style-type: none"> <li>• Procurement and distribution plan for solar LED lamps and LED bulbs.</li> <li>• Installation and training materials for lamp and bulb recipients.</li> <li>• Monitoring and evaluation reports on energy savings and environmental impact.</li> </ul>
Project Scope and Possible Implementation	<p>The project will focus on rural households in Lesotho and electrified homes, institutions, and businesses. Implementation will involve partnerships with local stakeholders and community engagement, and Lesotho Electricity Company for distribution and support services.</p>
Project Activities	<p><b>Phase 1: Distribution of Solar LED Lamps to Rural Households</b>  <b>Objective:</b> Replace paraffin and candles with solar-powered LED lamps.  <b>Actions:</b></p> <ul style="list-style-type: none"> <li>• <b>Needs Assessment:</b> Identify target communities lacking reliable electricity and using traditional lighting sources.</li> <li>• <b>Procurement:</b> Source reliable and durable solar LED lamps suitable for rural conditions.</li> <li>• <b>Distribution Strategy:</b> Partner with local NGOs, community organizations, or government agencies for efficient distribution.</li> <li>• <b>Installation and Training:</b> Provide installation support and training on lamp maintenance and solar charging.</li> <li>• <b>Monitoring and Evaluation:</b> Track usage and benefits (e.g., reduced indoor air pollution, improved study conditions for students).</li> </ul> <p><b>Phase 2: Provision of LED Bulbs to Electrified Locations</b>  <b>Objective:</b> Replace ILBs and CFLs with energy-efficient LED bulbs.  <b>Actions:</b></p> <ul style="list-style-type: none"> <li>• <b>Baseline Assessment:</b> Assess current lighting setups in electrified homes, institutions, and businesses.</li> <li>• <b>Procurement:</b> Purchase high-quality LED bulbs in bulk.</li> <li>• <b>Distribution Plan:</b> Collaborate with local utilities or businesses to distribute bulbs to identified locations.</li> <li>• <b>Awareness and Training:</b> Conduct workshops on energy efficiency and benefits of LED lighting.</li> <li>• <b>Follow-up and Support:</b> Provide troubleshooting support and collect feedback on bulb performance.</li> </ul>
Timelines	<p><b>Short-term (First 2 years):</b> Distribute 30 000 solar LED lamps and 5 000 LED bulbs.  <b>Medium-term (By 2030):</b> Scale up to distribute remaining 34 050 solar LED lamps and 25 000 LED bulbs.</p>
Budget / Resource Requirements	<p><b>Initial Investment [USD 150 000]:</b> Procurement of lamps and bulbs, logistics, training, and monitoring.  <b>Ongoing Costs [USD 50 000]:</b> Maintenance support, replacement parts, and community engagement.  Detailed budget breakdown and resource allocation plan to be developed</p>

Measurement / Evaluation	<p><b>Key Metrics:</b></p> <ul style="list-style-type: none"> <li>• Number of lamps and bulbs distributed,</li> <li>• Reduction in paraffin, candles, ILBs, and CFLs usage.</li> <li>• Energy savings and environmental impact assessments,</li> <li>• User satisfaction surveys and feedback.</li> </ul> <p>Monitoring and evaluation framework to track the impact of the project on energy consumption, cost savings, and environmental benefits, educational outcomes and economic benefits.</p> <ul style="list-style-type: none"> <li>• Reduction of electricity usage in the household sector will be monitored through the electricity meters installed in households and will be evident in the electricity balance. The decrease in peak demand will be assessed using the power meter at the National Dispatching Centre.</li> </ul>
Complications / Challenges	<p><b>Logistical Challenges:</b> Remote locations and infrastructure limitations.</p> <p><b>Financial Sustainability:</b> Funding for ongoing maintenance and support.</p> <p><b>Community Engagement:</b> Ensuring buy-in and sustained usage.</p> <p><b>Policy and Regulatory Issues:</b> Absence of legal regulations to enforce energy-efficient technology; Low-quality LEDs have made their way into the Lesotho market; Lack of awareness about energy-efficient lighting;</p>
Responsibilities and Coordination	<p>Clear delineation of roles and responsibilities among project partners and stakeholders is essential for effective coordination and implementation.</p> <ul style="list-style-type: none"> <li>• <b>Project Lead [Ministry of Energy and Ministry of Local Government]:</b> <i>Oversight of project implementation and coordination with stakeholders.</i></li> <li>• <b>Partners:</b> NGOs, women’s group, community organisations, other government agencies, LEC for distribution and support.</li> <li>• <b>Local Communities:</b> Participation in installation, maintenance, and feedback, and to provide local expertise.</li> <li>• <b>Private Sector:</b> For procurement and possibly sponsorship.</li> <li>• <b>LEC:</b> For collaboration in electrified areas</li> </ul>

## Chapter 2 Technology Action Plan and Project Ideas AFOLU Sector

### 2.1 TAP for Agriculture, Forestry and Other Land Use (AFOLU) Sector

#### 2.1.1 Sector overview

Lesotho is a high-altitude country that is completely landlocked by the Republic of South Africa. Nearly two thirds of the human population survive by subsistence agricultural production and seasonal casual work that are challenged by high climate variability, lack of modern and efficient farming tools, low yields as well as local and cross-border stock theft. Rainfall is erratic throughout the country both in space and time. The northern part of the country receives more rainfall than the south. Dry spells and droughts are frequent and can occur anytime during the summer rainfall season. This season is responsible for an average of 85% of the annual rainfall.

Land degradation is a major challenge in management of Lesotho's natural resources. Soil erosion by wind and rain make the country lose large volumes of soil each year. This challenge is mainly driven by poor land management practices and planning and sloppy terrain. Loss of soil results in decline of biodiversity resources that play a crucial role in the livelihoods of the people. Continuous loss of topsoil also leads to reduction of agricultural productivity and increase of marginal lands.

The AFOLU sector is the second largest source of GHG emissions in the country after energy. AFOLU was responsible for 2 417 Gg of CO<sub>2</sub>e in 2017 which represented 43% of total national emissions. Highest sources of the emissions are forest land (45%) and enteric fermentation (28%). Emissions from forest land are caused by large volumes of wood that is being harvested for fuelwood in the country.

The TNA Report I identified eleven technologies and prioritized them as presented below. The third technology was also prioritized in the Adaptation TNA work. It was then decided that the BAEF and TAP assessments for this technology be done under Adaptation because of the focus the country gives to building national resilience to climate change.

1. Small-scale biogas and homestead vegetable production in a mixed (crop and livestock) agricultural system
2. Carbon sequestration through agroforestry systems
3. Promotion of conservation agriculture (minimum tillage, mulching, retaining of crop residues)
4. Promotion of horticulture production through renewable energy irrigation scheduling and efficient fertilization (fertigation).
5. Promotion of Biological and Organic farming.
6. Land rehabilitation using agro-voltaic farming in Lesotho.
7. Promotion of field irrigation system using renewable energizes to improve productivity and reduce GHG emissions in Lesotho.
8. Production of biochar using crop straws, lablab, bamboos for crop fertilization.
9. Improvement of cattle production systems (breeds) in Lesotho.
10. Improvement of livestock feed during dry seasons.

**Table 2.1: Summary of objectives, aims and anticipated outcomes for AFOLU technologies**

Policy	Summarized objectives, aims and anticipated outcomes
National Strategic Development Plan II, 2019-2023	Aims to address challenges caused by climate change, other environmental and socio-economic issues that threaten national sustainable development. Outcomes of the NSDP II include:

	Sustainable Commercial Agriculture, and Food Security
Nationally Determined Contribution, 2017	Lesotho aims to achieve the following mitigation activities: <ul style="list-style-type: none"> <li>- Promote the use of bio-digesters in livestock farms</li> <li>- Increase share of organic manure in the used fertilizer mix</li> <li>- Promotion and incentivization of conservation agriculture</li> <li>- Maintaining livestock population at appropriate levels according to the pasture carrying capacity</li> <li>- Increase mechanization in agriculture</li> </ul>
National Climate Change Policy, 2017 – 2027	The policy aims to achieve the following: <ul style="list-style-type: none"> <li>- Promote climate-smart agriculture and food security systems</li> <li>- Develop renewable energy sources and increase energy efficiency.</li> <li>- Enhance best practice for forestry and rangelands to mitigate and adapt to climate change.</li> </ul>
Lesotho Climate-Smart Agriculture Investment Plan, 2019	Plan to achieve carbon balance from climate-Smart Agricultural practices through: <ul style="list-style-type: none"> <li>- Afforestation</li> <li>- Shift from annual crops to orchards</li> <li>- Rangeland improvement</li> <li>- Improved orchards practices</li> <li>- Grassland management</li> <li>- Livestock management</li> <li>- Fertilizer applications</li> <li>- Aquaculture</li> </ul>
National Range Resources Management Policy, 2014	Key policy areas <ul style="list-style-type: none"> <li>- Sustainable management of rangeland</li> <li>- Conservation of biodiversity and maintenance of ecosystem</li> <li>- Rangelands monitoring and research</li> <li>- Maintenance and protection of wetland areas</li> <li>- Socio-economic dimensions.</li> </ul>
National Climate Change Policy Implementation Strategy, 2017	Strategic objectives of the strategy: <ul style="list-style-type: none"> <li>- To increase resilience of Lesotho to the impacts of climate change by reducing climate risks to people, ecosystems and built environment while restoring and ensuring the rational use and the protection of natural resources</li> <li>- To identify and make use of opportunities to reduce GHG emissions that simultaneously contribute to the sustainable and affordable use of natural resources and access to finance and technology and reduce pollution and environmental degradation</li> <li>- To strengthen the governance, institutional and human capacity enabling access to technological and financial resources for the implementation of the CCP with the equal participation of women, men, youth, vulnerable groups, the civil society and the private sector</li> </ul>
National Forestry Policy, 2008	Overall objectives of the policy are: <ul style="list-style-type: none"> <li>- Sustainable forest management</li> <li>- Social and economic dimensions of forestry development</li> <li>- Enhancing equitable access and participation of stakeholders in forestry development</li> </ul>

## 2.1.2 Action Plan for small-scale biogas and homestead vegetable production in a mixed (crop and livestock) agricultural system

### 2.1.2.1 Introduction

Energy provision is an important need for societal development. Biogas is one of the renewable energy sources that can provide a sustainable energy solutions. This technology can be easily adaptable to remote homesteads that may be hard to connect to national grids and these farming households may not be able to afford other forms of sustainable energy sources.

Cattle production is the main source of GHG emissions from livestock. They produce methane (CH<sub>4</sub>) from enteric fermentation and manure management. There is also nitrous oxide (N<sub>2</sub>O) from manure litter. In Lesotho, cattle are taken to the communal rangelands in the mornings and return for sleep in



the small enclosure of kraals. The dung they leave in the kraals and the rangelands is dried and used as fuel source in the form of *lisu* (dried cow dung) by many households.

Methane that is produced from manure and agro-industrial waste management systems can be captured using anaerobic digestion technologies including small-scale digesters. Cattle dung can be used to produce biogas that can be used to supply clean energy at household levels. Cow dung contains CH<sub>4</sub> which has a greenhouse effect that is 25 times greater than that of CO<sub>2</sub>. Biogas is produced under anaerobic conditions and contains CH<sub>4</sub>.

Biogas contains 50-70% combustible CH<sub>4</sub>, 20-40% CO<sub>2</sub> and other trace gases. When it is burned, CH<sub>4</sub> is converted to CO<sub>2</sub> and water, reducing the greenhouse impact. Collected biogas can provide basic household energy requirements like cooking.

Construction of a biogas plant requires a capital cost (~LSL 20 000 per unit) which many subsistence and small-scale farmers may not have (Meyer et al., 2021). In addition to not prioritizing biodigesters, financial institutions in Africa charge high interest rates on loans for biogas technologies and limit access to affordable long-term finance (Clemens et al., 2018).

#### **2.1.2.2 Ambition for the TAP**

The ambition of this TAP is to develop at least one hundred biogas digesters in four years in farming households and emerging commercial dairy farmers in Lesotho, to create sustainable renewable energy and to reduce farm emissions. Dairy farming is a growing enterprise in the country and already has established the National Dairy Board as its commercial and governance structure. This technology pilot will focus on the farmers that are located in the lowlands of Lesotho where they will be closer to the dairy markets and where the impact of low winter temperatures is limited.

The biogas digesters in the emerging commercial farming environment will be designed to achieve farm self-sufficiency in terms of renewable energy. The aim will be to develop hundred pilot medium sized biogas plants that can provide enough biogas to supply energy requirements for hundred households or small farms throughout the country. A biogas plant fed with about 60 kg of wet cow dung a day can produce 1.25 m<sup>3</sup> of biogas (Nijaguna, 2002, Meyer et al., 2021). A farming household needs about 3 kWh for cooking per day (Meyer et al., 2021). This suggests that a biogas plant has a potential to support up to two households or an expanded household. Manure from between 15 and 50 cattle have potential meet farm energy demand (cooking and electricity for heating and cooling of water) (Villarroel-Schneider et al., 2022).

Depending on the size of the plant, a biogas system has a potential to replace a large fraction of commercial liquified petroleum gas, thus sustainably saving costs (Obileke et al., 2022). Biogas digester systems in medium sized farms (15-50 cattle) have a potential to reduce GHG emissions including contributions from consumption of fossil fuels or carbon intensive grid electricity as well as CH<sub>4</sub> and N<sub>2</sub>O from manure management.

Production of renewable energy from biogas digesters in a household will prevent young girls and women from going out to collect fuelwood and other forms of biomass energy in the forests and fields. Biogas energy production enables constant cooking inside the house and will eradicate cooking outside of the houses that is common with the use of biomass.

At current costs, biogas plants for one hundred farming households would require a total capital investment of not less than USD 210 556.

The INDC (LMS, 2017) identified promotion and use of biodigesters in livestock farms as a key mitigation activity with the following targets;

- Improve agricultural systems for both crops and livestock.
- Develop strategies for improved resource management.
- Gradual replacement of 100% of mineral fertilizers with organic fertilizers by 2030.

### **Gender issues**

The ambition of this TAP is to be gender inclusive as discussed below.

- **Gender Analysis Requirement:** It will be important that project propositions address gender considerations. These considerations may include accessibility (from where it is constructed) and should be easy to operate. This will be important especially when the technology will depend on feedstock from animals.
- **Gender-Sensitive Criteria:** It will be important that gender issues be incorporated during the evaluation and selection of TAP ideas and proposals. Evaluation and selection criteria of project proposals should consider capacity of the technology to address gender inequalities and empower women and girls.
- **Inclusive Stakeholder Engagement:** All genders and age groups will need to be consulted during project development. This will ensure that gender responsive projects are developed and implemented.
- **Gender-Disaggregated Data Collection:** Data collection is important for project monitoring and evaluation. It will be encouraged that project developers include in their data collection, gender-specific parameters and indicators. Research activities associated with this technology will also need to have special attention to gender issues.
- **Capacity Building:** All aspects of capacity building need to be gender-sensitive and put special focus to marginalized members of society particularly women, girls and people with special needs.
- **Peer Review and Feedback:** It will be important that peer review mechanisms related to this technology be gender responsive. This will include memberships of the mechanism and the expertise of members – to include gender experts.
- **Monitoring and Reporting Requirements:** It will important that regular progress reports, case studies and lessons learned include gender-specific indicators and parameters.

### **2.1.2.3 Actions and activities selected for inclusion in the TAP**

#### **Summary of barriers and measures to overcome barriers**

Table 2.2 provides a summary of barriers and measures to overcome barriers.

**Table 2.2: Summary of barriers and measures to overcome barriers for biogas digester technologies**

<b>Barrier type</b>	<b>Identified barriers</b>	<b>Measures to overcome barriers</b>
Financial and economic	High capital costs and lack of funding	Develop frameworks to support farmers afford capital costs.
Market conditions	Lack of local manufacturing industries for these technologies, increasing investment costs for imports	Increase involvement of private sector and technical training institutions in the development of technologies.
Legal and regulatory	Lack of regulations and standards on imported technologies lead to substandard imported technologies	Develop regulations and standards to avoid substandard imports
	Lack of policy, and monitoring and evaluation systems	Develop capacity to monitor and evaluate technology in the country
Network	There is lack of participation of private sector and civil society in the implementation process of technologies	Improve coordination between stakeholders including private sector.
Institutional and organizational capacity	There is lack of resources to provide support for technology implementation.	Develop sustainable mechanisms to provide resources to stakeholders

Human skills	There is lack of trained technicians to install and maintain biogas technologies	Develop training programs for technicians through
Social, cultural and behavioural	Biogas application with only cooking capability may be rejected	Promote biogas technologies showcasing their benefits
Information and awareness	Lack of research and publicity about the biogas technology	Increase awareness about the technology
Technical	Low temperatures particularly in winter may reduce efficiency of biogas systems	Identify other energy sources during periods of low biogas yields.
	Livestock theft and water insecurity may put operations of the technologies at risk	Prevent livestock theft and identify alternative sources of water during drought periods

### **Actions selected for inclusion in the TAP for Biogas Digester development in mixed small-scale production systems**

**Action 1: Creating a unit** that will facilitate development of frameworks and provision of predictable financial incentives for biogas technologies. This unit will be dedicated to foreseeing full implementation of the biogas digester plants throughout the country. It will be responsible for soliciting funds, liaising with other relevant public institutions, private sector, civil society and technology beneficiaries.

- This unit will have to be capacitated with skilled staff and resources that will assist it carryout its mandate. Its functions and reporting structure will have to be detailed out properly to avoid conflicts and overlaps with other institutions.
- It is recommended that this unit be housed within the Ministry of Environment and Forestry which is responsible for climate change issues in the country. This is because the functions of the unit will encompass coordination of several climate change issues.

**Action 2:** Creation of research capacity for biogas digesters in institutions of higher learning and relevant institutions. This action will require provision of skilled staff and equipped research facilities. Capacitated institutions will then be able to produce data and research outputs, skilled people that can be able to monitor and evaluate technology implementation, provide labour to construct and maintain the technologies. This action will ensure sustainable implementation of the technology including its scaling up.

**Action 3:** Develop human and institutional capacity required for the technology. Beneficiaries of the technology (farmers) will need to be capacitated about technology management and institutions that will be assisting beneficiaries will need to be capacitated with resources (tools and other material resources) and skills. Many beneficiaries may not be familiar with the technology and/or may not be well educated and therefore may need to be regularly visited and constantly reskilled.

**Action 4:** Carryout pilot projects to assess efficiency of the technology in the country. There is lack of information and data about this technology in the country. For successful scaling up of the technology, pilot projects will be helpful to generate lessons learned that can inform rolling out of the technology implementation.

### **Actions selected for inclusion in the TAP**

The actions and activities in Table 2.3 are identified to be included in the TAP.

**Table 2.3: Actions and activities identified for the implementation of biogas digester technology**

Actions	Activities
<b>Action 1:</b> Create a unit that facilitate development of frameworks and provision of	1.1. Recruit qualified staff to work in the unit 1.2. Promote and encourage private sector & financial institutions to support and finance technology.

predictable financial incentives for biogas technologies	1.3. Encourage development partners to support implementation of this technology.
<b>Action 2:</b> Establishment of research capacity for biogas digesters in institutions of higher learning and other relevant stakeholders.	2.1. Provide consistent funding for research and development. 2.2. Encourage and promote research collaborations between local, regional and overseas research institutions. 2.3. Develop and share lessons learned from systems currently installed in the country and in the region.
<b>Action 3:</b> Develop human and institutional capacity required for the technology.	3.1. Establish a training program for development of human skills in local institutions and farmers. 3.2. Provide relevant institutions (public, educational, etc) with resources that are necessary for technology implementation.
<b>Action 4</b> Carryout pilot projects to assess efficiency of the technology in the country.	4.1. Identify farmers that can pilot the technology. 4.2. Supply the extension services and farmers with training and technologies. 4.3. Conduct monitoring and evaluation of the technology.

### ***Gender issues***

All the activities identified in the Table above will seek to achieve gender outcomes. Females and youth will need to be prioritized when it comes to training and various forms of capacity development. Financial institutions will need to be encouraged to be gender sensitive in their support of the technology. Gender parity will also need to be achieved in the pilot studies that are proposed.

1. **Gender Analysis Requirement:** Actions and activities that will be selected to be included in the TAP will need to consider gender issues. The analysis will have to consider ability of women and girls to operate and to take good care of the burning points of the biogas technology. This is because the women and girls will frequently operate the ignition points of the technology.
2. **Gender-Sensitive Criteria:** The criteria that will be used when implementing actions and activities will need to ensure that men are more focused on the mechanical parts of the technology (i.e., installation and maintenance) and feeding of the biogas systems while attention for women should mainly be on operations.
3. **Inclusive Stakeholder Engagement:** It will be important that stakeholders that will be involved in the TAP activities have fair representation of men to facilitate technology installation and maintenance, women to represent the use of the technology and youth for skills transfer and succession management.
4. **Gender-Disaggregated Data Collection:** Data collection will need to consider and report on the different responsibilities that will be carried out by men and women. Data that will be collected will need to have disaggregated indicators regarding issues around installation, maintenance, operations as they will be performed by different genders. Data collection itself will need to have fair representation of people of different gender and age groups where possible.
5. **Capacity Building:** Capacity building will need to consider installation issues for men and operations for women.
6. **Peer Review and Feedback:** It will be important that peer review mechanisms related to actions and activities have fair representation of women and men who have fair understanding of mechanical and operational issues of the biogas technologies.
7. **Monitoring and Reporting Requirements:** Monitoring and reporting requirements of the actions and activities of the TAPs will need to highlight different issues as carried out by men and women during implementation of the technology.

#### **2.1.2.4 Stakeholders and timeline for implementation of TAP**

*Overview of Stakeholders for the implementation of the TAP*

Stakeholders and their roles for implementation of biogas digesters in the country are identified Table 2.4 below.

**Table 2.4: Stakeholders and their roles for implementation of biogas digesters**

Stakeholder	Roles
MFDP	<ul style="list-style-type: none"> <li>○ The MFDP is responsible for the fiscal policy and national development framework.</li> <li>○ This Ministry also plays a critical role with financing and supporting of national human capacity development.</li> <li>○ The Ministry has developed a Public-Private Partnership (PPP) Policy to encourage and manage the PPPs. The Ministry needs to develop the PPP laws and supporting regulations in order to obtain optimum potential of the partnerships (Lesotho, 2021).</li> </ul>
Ministry of Information, Communication, Science, Technology and Innovation (MICSTI)	<ul style="list-style-type: none"> <li>○ The Ministry is responsible for establishment of a national Research and Innovation Agency to provide a framework and guidance on research and innovation, and to undertake mobilization of research resources.</li> <li>○ Prioritization of investments in collaborative scientific research and development to strengthen local innovation and technological capabilities.</li> <li>○ Improvement of inclusion and socioeconomic equality and equity in R&amp;I to align and mainstream socioeconomic equality and the inclusion of all marginalized groups (women, girls, herd boys, rural youth, disabled persons and all other disadvantaged persons) in science, technology, engineering and mathematics education, research and occupations.</li> <li>○ Integration of indigenous knowledge systems and management of intellectual property protection to nurture the talent of ordinary citizens.</li> <li>○ Creation of a conducive business environment for innovation – to create and improve the regulatory environment in support of innovative start-ups and improve the performance of MSMEs.</li> <li>○ Strengthening access to R&amp;I information by strengthening various institutions' ability to manage their own data, create an open data platform to make non-confidential R&amp;I information easily available, share regular updates on R&amp;I-related activities.</li> <li>○ Adoption of new and relevant emerging technologies by supporting the adoption of technologies for emerging applications with a strong focus on technical training to initiate a rapid transition to climate-resilient green economy.</li> </ul>
MET	<ul style="list-style-type: none"> <li>○ Strengthening of tertiary education and workforce training programmes to provide programmes that are required to improve efficiency and effectiveness of the sector in responding to national needs and challenges.</li> </ul>
MAFSN	<ul style="list-style-type: none"> <li>○ Responsible for all agricultural activities in the country including livestock production.</li> <li>○ Through the Extension Services, the Ministry is the entry point to access to and working with farmers in the country.</li> </ul>
MDNSE	<ul style="list-style-type: none"> <li>○ The Ministry through LMS is the national climate change focal point.</li> <li>○ The Lesotho Meteorological Services has over the years gained huge experience on the technicalities of how to access climate change financing from the international organizations.</li> </ul>
Institutions of Higher Learning	<ul style="list-style-type: none"> <li>○ These institutions can provide training to farmers, officials and students about the technology.</li> <li>○ These institutions will need to conduct research and trials for the technology to determine its applicability in the country before it is scaled out to farmers.</li> </ul>
Farmers and Farmer Associations	<ul style="list-style-type: none"> <li>○ Farmers that will be involved in the implementation of the technology.</li> <li>○ Some farmers have organized themselves into several associations. Farmers share experiences and lessons learned in these associations.</li> </ul>
NGOs & Civil societies	<ul style="list-style-type: none"> <li>○ Non-government organizations and the civil society are usually embedded in communities and have vast knowledge of how the needs of communities.</li> <li>○ Involvement of these organizations during the implementation and operations of the technologies can enhance the success rate.</li> <li>○ These organizations also have potential to garner international support and funding which can further boost scaling out of the technologies.</li> </ul>

Private sector	<ul style="list-style-type: none"> <li>○ Greater involvement of private sector can improve investments associated with the technology.</li> <li>○ Compared to the public sector, the private sector is reputable for professional and efficient management of projects.</li> <li>○ The PPPs can further enhance success rate of many projects.</li> </ul>
Development Partners	<ul style="list-style-type: none"> <li>○ Development partners have for many years supported Lesotho through financing of projects and programmes, and capacity building initiatives.</li> <li>○ This sector is envisioned to provide the country with many aspects of development.</li> <li>○ The sector has potential to cross pollinate technology diffusion in the country with many other experiences elsewhere where they have been involved.</li> </ul>

### *Scheduling and sequencing of specific activities*

The schedule in Table 2.5 is proposed for implementation of the technology.

**Table 2.5: Schedule and sequence of the activities prioritized for implementation of biogas technology**

Actions	Activities	Years			
		1	2	3	4
<b>Action 1:</b> Create a unit that facilitate development of frameworks and provision of predictable financial incentives for biogas technologies	1.1 Recruit staff for the unit				
	1.2 Promote and encourage private sector & financial institutions to support and finance technology.				
	1.3 Encourage development partners to support implementation of this technology.				
<b>Action 2:</b> Establishment of research capacity for biogas digesters in institutions of higher learning and other relevant stakeholders.	2.1 Provide consistent funding for research and development.				
	2.2 Encourage and promote research collaborations between local, regional and overseas research institutions.				
	2.3 Develop and share lessons learned from systems currently installed in the country and in the region.				
<b>Action 3:</b> Develop human and institutional capacity required for the technology.	3.1 Establish a training program for development of human skills in local institutions and farmers.				
	3.2 Provide relevant institutions (public, educational, etc) with resources that are necessary for technology implementation.				
<b>Action 4:</b> Create a unit that facilitate development of frameworks and provision of predictable financial incentives for biogas technologies	4.1 Identify farmers that can pilot the technology.				
	4.2 Supply the extension services and farmers with training and technologies.				
	4.3 Conduct monitoring and evaluation of the technology.				

### *Gender issues*

The issues identified below will need to be taken note of during implementation of the TAP.

1. **Gender Analysis Requirement:** Scheduling activities about installations and maintenance of the technology will be mainly conducted and carried out by men. However, women that maybe interested in these activities will need to be considered. Scheduling and sequencing of operational issues of the technology will need to focus more on women than men as the former will be the main user of the technology.
2. **Inclusive Stakeholder Engagement:** Men and women will need to be consulted efficiently during scheduling and sequencing especially on the issues that relate to their different functions and roles throughout the implementation of the technology.
3. **Gender-Disaggregated Data Collection:** Sequencing of data collection will need to consider different periods in which men and women will carry-out their specific tasks (i.e., installation and

maintenance for men and operations for women). This will ensure that data reporting is disaggregated.

4. **Monitoring and Reporting Requirements:** Scheduling and sequencing about monitoring and reporting may need to consider different periods in which activities will be carried out. This will ensure that gender specific issues are monitored and reported according to their times of implementation.

#### 2.1.2.5 Estimation of resources needed for action and activities

##### *Estimation of capacity building needs*

The following capacity building needs for successful implementation of agroforestry systems to sequester carbon emissions in Lesotho are identified:

**Sustainable funding and project management:** Implementation of biogas systems require large capital costs which farmers may not afford. It is therefore important that sustainable public, private sector and international funding are secured. To obtain consistent funding, the country will need to develop capacity building to mobilize financial resources. This includes identification of potential sources of funding and their application requirements. Funding by the private sector needs to be mobilized which may require improvement of enabling environment by the government. It will also be important that the country especially the public sector develop capacity to manage projects so that implementation efficiency of the projects can be improved.

**Integrated research programme:** Suitability of the technology in the country may need to be established. This is because cold temperatures in winter may reduce efficiency of the technology especially in the highlands. As a result, it will be important that technical details of the technology be researched so that optimum efficiency of the technology is achieved. Local research will need to be increased, human and institutional capacity developed.

**Development of artisans:** Implementation of biogas systems at large scale will require availability of people that can construct and build them. Training programs will be required for the artisans throughout the country. This capacity building will also assist with maintenance activities of the systems and optimization of resources.

##### *Estimations of costs of actions and activities*

The costs in Table 2.6 are estimated for implementation of biogas digester technologies in the country.

**Table 2.6: Estimated costs for activities to implement biogas digester technologies in Lesotho**

Actions	Activities	Costs (USD)
<b>Action 1:</b> Create a unit that facilitate development of frameworks and provision of predictable financial incentives for biogas technologies	1.1. Recruit qualified staff to work in the unit	166 667
	1.2. Promote and encourage private sector & financial institutions to support and finance technology	2 222
	1.3. Encourage development partners to support implementation of this technology	1 111
<b>Action 2:</b> Establishment of research capacity for biogas digesters in institutions of higher learning and other relevant stakeholders	2.1. Provide consistent funding for research and development	5 556
	2.2. Encourage and promote research collaborations between local, regional and overseas research institutions	6 667
	2.3. Develop and share lessons learned from systems currently installed in the country and in the region	2 778
<b>Action 3:</b> Develop human and institutional capacity required for the technology	3.1. Establish a training program for development of human skills in local institutions and farmers	4 444
	3.2. Provide relevant institutions (public, educational, etc) with resources that are necessary for technology implementation	7 222

<b>Action 4:</b> Carryout pilot projects to assess efficiency of the technology in the country	4.1. Identify farmers that can pilot the technology	5 556
	4.2. Supply the extension services and farmers with training and technologies	2 778
	4.3. Conduct monitoring and evaluation of the technology	5 556
<b>Total</b>		<b>210 556</b>

### *Gender issues*

Energy that will be generated by implementing biogas digester technologies will be used in the households of the farmers.

- This will reduce or remove the need for women and girls to go out to collect biomass for cooking. Human development about the technology will consider and prioritize involvement of women and girls.
- Time which women take to collect biomass for fire will be reduced when this technology is implemented. The saved time can be used to undertake other important household activities.
- The implementation of the biogas technology will reduce the use of other fuels especially for cooking. These other fuels may include paraffin and liquefied petroleum gas that are bought by women and children in the households. This will translate to savings of money for the households.
- The implementation of biogas technology will improve air quality and reduce injuries from burnings from open fires in the households that affect mostly women and children. This will assist households to save on the medical expenses that are incurred to treat respiratory diseases and wounds from burning.
- Organic manure from biogas slurry that will be used in the gardens and orchards will reduce spending on inorganic fertilisers. This will be a saving especially to women who often manage day-to-day expenses of the household.

#### **2.1.2.6 Management planning**

##### *Risks and Contingency Planning*

Risks and contingent plans are identified in Table 2.7 below.

**Table 2.7: Identified risks and possible contingency plans**

Type of risk	Description of risk	Contingency actions
Cost	Projects in the country take time to plan and execute. It is possible that the capital costs during implementation might have changed due to delays in the project planning stage.	The Government of Lesotho can plan to source funding from funders that do not have lengthy application process (i.e., development partners) to quicken funding.
	Poorly constructed biogas systems that may need rebuilding or cost highly to repair.	Develop standards for technologies. Give accreditation artisans and assign them responsibility to build the units.
Scheduling	It may take long time to promote the technology with the farmers and other stakeholders.	The Government of Lesotho will need to be proactive during the implementation stage. Units and accessories will need to be ordered in bulk to avoid unnecessary multiple purchases.
	Prefabricated technologies, if selected for implementation, may take time to be delivered after they are ordered from manufacturers.	
Management	Poor management of the technology may lead to spillage of slurry that can cause untidy environment.	Beneficiaries will need to be trained about proper operation and management of the technology, and ensure slurry is fully used in the homestead garden.



Finance	Funding implementation of this technology may not be in the current framework of the government and other potential funders.	The Government of Lesotho will have to be proactive and engage development partners and the private sector to fund the technology in the short term and beyond.
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### *Next Steps*

It is important that biogas technology that will be suitable for Lesotho be identified, considering temperature regimes prevalent in the country as the efficiency of the technology may be reduced when soil temperature drops. Due to capital costs that may be high for farmers, affordable options between prefabricated and, brick and mortar technologies will need to be established and encouraged to the farmers. All these will affordability of the technology and will also improve technical efficiency of the technology throughout the year.

Human capacity to build the technologies will need to be developed. Both formal and informal training of artisans, farmers and extension services officials will be required prior to full scale implementation of the technologies.

Technical standards of the technologies will need to be established. They are required to avoid implementation of substandard technologies.

Critical steps that will need to be considered to increase success rate of technology implementation are:

1. Development of policy for the technology and reform of land tenure system in the country.
2. Promotion of technologies to funders, farmers and other key stakeholders.
3. Through research, identify technologies that may be suitable for the country considering environmental conditions.
4. Identification of technology beneficiaries (farmers)
5. Capacity building of farmers, extension services officials and artisans.

### *Gender issues*

Planning for the management of the technologies will need to be gender inclusive and to consider sufficient inclusion of women. All these will need to be taken care of during the establishment of immediate requirements and identification of critical steps key to successful implementation of the technology.

- Women will need to be empowered to manage activities that relate to operations of the technology.
- Women and men may be capacitated to collect data that relates to activities that take place during different periods of the technology implementation - especially during periods when they are engaged with activities of the technology.

### **2.1.2.7 Reporting**

The TAP table is presented below in Table 2.8.

### *Gender issues*

Reporting on TAP implementation will need to consider the following gender issues:

- Reporting on biogas technology activities will need to include gender disaggregated indicators. Statistics of women and men involved in each activity of the TAP will have to be reported on.

- Peer reviewers of the biogas TAP reports will need to have gender experts that will be able to provide proper gender perspectives of the issues of the TAPs.

**Table 2.8: Overview table for biogas digester development for small scale mixed farming systems**

TAP overview table								
<b>Sector:</b>	Agriculture, Forestry and Other Land Use							
<b>Sub-sector:</b>	Bioenergy							
<b>Technology</b>	Biogas digester development for small scale mixed farming systems							
<b>Ambition</b>	<ol style="list-style-type: none"> <li>1. Installation of one hundred biogas digesters at small scale farming households in Lesotho.</li> <li>2. To achieve approximately 1 m<sup>3</sup> of biogas renewable energy per day per household consumption.</li> <li>3. To reduce approximately 27% of CH<sub>4</sub> and N<sub>2</sub>O emissions from cattle manure.</li> <li>4. Implementation will take approximately four years</li> </ol>							
<b>Benefits</b>	<b>This technology will also produce slurry that can be used as manure in household gardens. The gardens can produce vegetables and orchards that can improve household food security.</b>							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (years)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (USD)
<b>Action 1: Establish a unit that will oversee implementation of the agroforestry technologies</b>	<b>Activity 1.1:</b> Recruit staff for the unit	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Private sector / financial institutions</li> </ul>	MICSTI	1-2	<ul style="list-style-type: none"> <li>• Stakeholders not participating</li> <li>• Lack of funding</li> </ul>	<ul style="list-style-type: none"> <li>• Framework established</li> </ul>	<ul style="list-style-type: none"> <li>• Number of meetings or workshops held</li> </ul>	166 667
	<b>Activity 1.2:</b> Promote and encourage private sector & financial institutions to support and finance technology.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Private sector / financial institutions</li> </ul>	MICSTI	1	<ul style="list-style-type: none"> <li>• Lack of incentives for private sector</li> <li>• Lack of framework</li> </ul>	<ul style="list-style-type: none"> <li>• Active participation of private sector / financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>• Private sector / financial institutions investment values</li> </ul>	2 222
	<b>Activity 1.3:</b> Encourage development partners to support implementation of the technology.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> </ul>	MICSTI	1-2	<ul style="list-style-type: none"> <li>• Lack of support from partners</li> </ul>	<ul style="list-style-type: none"> <li>• Active participation of development partners in technology implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Development partners investment / support value</li> </ul>	1 111
<b>Action 2: Support research and development program associated with renewable biogas energy</b>	<b>Activity 2.1:</b> Provide consistent funding for research and development.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	3-4	<ul style="list-style-type: none"> <li>• Lack of funding</li> <li>• No research program</li> </ul>	<ul style="list-style-type: none"> <li>• Research outputs produced</li> </ul>	<ul style="list-style-type: none"> <li>• Funding amount provided</li> </ul>	5 556
	<b>Activity 2.2:</b> Encourage and promote research collaborations between local, regional and overseas research institutions.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MET	2-3	<ul style="list-style-type: none"> <li>• No research partners</li> <li>• No research program</li> </ul>	<ul style="list-style-type: none"> <li>• Research collaborations established</li> </ul>	<ul style="list-style-type: none"> <li>• Research collaborations established</li> </ul>	6 667
	<b>Activity 2.3:</b> Develop and share lessons learned from systems currently installed in the country and in the region.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	1-5	<ul style="list-style-type: none"> <li>• Lack of technology implementation</li> <li>• Lack of data collection</li> <li>• Lack of documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Number of lessons shared</li> </ul>	<ul style="list-style-type: none"> <li>• Number of lesson materials developed</li> <li>• Number of lessons shared</li> </ul>	2 778
<b>Action 3: Develop human and institutional capacity required for the technology.</b>	<b>Activity 3.1:</b> Establish training programs for development of human skills in local institutions and farmers.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Research institutions</li> </ul>	MICSTI	1-3	<ul style="list-style-type: none"> <li>• Lack of trainees</li> <li>• Lack of institutional support</li> <li>• Lack of funding</li> </ul>	<ul style="list-style-type: none"> <li>• Training programs developed</li> </ul>	<ul style="list-style-type: none"> <li>• Number of training programs established</li> <li>• Number of people trained</li> </ul>	4 444

	<b>Activity 3.2:</b> Provide relevant institutions with resources that are necessary for technology implementation.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	1-5	<ul style="list-style-type: none"> <li>• Lack of resources</li> <li>• Lack of institutional support</li> <li>• Poor project management</li> </ul>	<ul style="list-style-type: none"> <li>• Number of resources (by type) provided to institutions</li> </ul>	<ul style="list-style-type: none"> <li>• Number of resources (by type) provided</li> </ul>	7 222
<b>Action 4:</b> <b>Conduct pilot projects to assess efficiency of the technology in the country.</b>	<b>Activity 4.1:</b> Identify and supply farmers that can pilot the technology with stock.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	1-2	<ul style="list-style-type: none"> <li>• Lack of interest from farmers</li> <li>• Poor project management</li> </ul>	<ul style="list-style-type: none"> <li>• Number of technologies successfully piloted</li> </ul>	<ul style="list-style-type: none"> <li>• Number of farmers identified</li> <li>• Number of technologies piloted</li> </ul>	5 556
	<b>Activity 4.2:</b> Supply the extension services and farmers with training and technologies.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	1-5	<ul style="list-style-type: none"> <li>• Lack of qualified trainers</li> <li>• Lack of training resources</li> </ul>	<ul style="list-style-type: none"> <li>• Number of trainings provided</li> </ul>	<ul style="list-style-type: none"> <li>• Number of extension service officials trained</li> <li>• Number of farmers trained</li> </ul>	2 778
	<b>Activity 4.3:</b> Conduct monitoring and evaluation of the technology.	<ul style="list-style-type: none"> <li>• GoL</li> <li>• Development partners</li> <li>• Bilateral / multilateral institutions</li> <li>• Research institutions</li> </ul>	MICSTI	1-5	<ul style="list-style-type: none"> <li>• Lack of guidelines</li> <li>• lack of standards</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring and evaluation reports</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring and evaluation reports produced</li> </ul>	5 556

### 2.1.2.8 Tracking the implementation status of the TAP

#### *Rationale, responsibility and content of TAP tracking*

Implementation of the biogas digester TAPs in Lesotho will need institutional arrangements that will include setting up of a unit and a system that will track their status. The system will need to harness biogas expertise and resources from different public and private sector institutions and to also improve overall coordination of technology development and implementation in the country.

Tracking the implementation status of the TAPs will need the use of appropriate tools. Develop tools and mechanisms that will collate experiences of implemented technologies and TAPs under development. This will be important because implementation of pilot biogas projects will be done at different locations. Lessons learned are important because they assist in the documentation of technology information and data, raising public awareness and up scaling technology implementation.

While the biogas technology will be implemented by the MAFSN who deal directly with the farmers, the MICSTI as the custodian of technology development and innovation in the country, will be responsible for overall registration of mitigation technologies of which biogas digesters will be part of. The centralized registration of the technologies will assist with the establishment of focussed institutional set up in the Ministry.

The Ministry of Environment and Forestry is the national focal point for all climate change issues. The TNA and TAP process are part of the broader climate change issues under the UNFCCC and their tracking and implementation status may have to be reported to the Secretariat of the Convention. The reporting and contents thereof will be according to the requirements of the Convention. The information that will need to be tracked or reported on include:

- Challenges including barriers encountered during implementation of biogas projects.
- Strategies identified or used to address the identified challenges and barriers.
- Linkages of biogas TAPs to other national plans.
- Next steps needed by the biogas TAPs and resources required.

#### *Gender issues*

Tracking of biogas technologies will have to consider and to put emphasis on contributions made by women and girls in all activities of the projects.

1. **Gender-Disaggregated Data Collection:** This will require the collection of gender-disaggregated data that include among others, information on the number of men, women and girls as well as youth and elderlies that have benefited from biogas TAP activities, their representations and participation rates, preferences, and outcomes.
2. **Gender-Responsive Indicators:** It will be important that gender-responsive indicators are developed to assess the full impact of TAP interventions on gender equality and women's empowerment. Representation of women and girls in decision-making process of the TAPs will be a key indicator.
3. **Gender Mainstreaming Targets:** Tracking of implementation of biogas TAPs need gender mainstreamed targets. The targets will need to focus on commitments towards gender empowerment particularly for women and girls. The targets also need to provide targets for beneficiaries between women and men ensuring that women get a fair share of beneficiaries. There needs to be targets for leadership roles capacity building activities

## **2.1.3 Action Plan for Technology: Carbon sequestration through agroforestry systems**

### **2.1.3.1 Introduction**

Agroforestry combines production of trees with crops or grasses. As a result, agroforestry technologies combine afforestation and improvement of food security and nutrition. In addition to potential GHG mitigation benefits depending on operational management practices, this can also provide other social and ecosystem-related services. Regarding mitigation applications, agroforestry technologies aim to reduce GHG emissions through carbon sequestration by planted biomass, prevention of land degradation and organic improvement of soil health.

Agroclimatology of Lesotho is suitable for fruit trees production. The cold winter climate of the country can provide a chilly environment for Mediterranean fruits. Land degradation, a challenge that has existed for a long time, provides a great opportunity for agroforestry applications that can be used to conserve soil. Although supplementation with irrigation may be necessary on some occasions, cold temperatures and several snow occurrences in winter are favourable for cultivation of Mediterranean fruit trees including grapes, apricots and citrus.

Plants remove carbon dioxide from the atmosphere through photosynthesis and keep it as both biomass above ground (leaves and stems) and below ground (roots). Soil organic matter consists of 50-58% carbon, loss of organic matter during conventional tillage results in a significant sources CO<sub>2</sub> emissions into the atmosphere (Sollen-Norrin et al., 2020). Improvement of agroforestry assists by storing carbon in the terrestrial systems and prevents carbon loss through land degradation.

This technology can mitigate emissions by restoring degraded grazing lands by through a combination of intensive, extensive agroforestry (silvopastoral) livestock systems and planting of improved and nutritious forage trees. Agroforestry involves integration of forest (or tree) planting with other crops and grasses. Trees are planted at strategic points in the field to allow for production of crops together with them. Agroforestry enhances biomass production and therefore carbon sequestration. Trees in this system provide shading which reduces evapotranspiration, prevents soil erosion and increase nutrient cycling. They also protect crops from strong winds and storms. Crops grown can include fodder crops (pastures) for livestock. Since roots of trees extends to deeper soil levels, they avoid competition for resources with other crops and other trees which they are integrated with.

Agroforestry systems improve soil carbon content which improves overall soil fertility. As a result, crop and tree yields produced in agroforestry required 14–34% less land or fewer resources in terms of light, water, nutrients, compared to monoculture systems (Sollen-Norrin et al., 2020).

### **2.1.3.2 Ambition for the TAP**

**Ambition:** The ambition for this technology is:

1. A plantation of 1 000 ha of agroforestry systems that consists of forests and fodder grasses over a four-year period in the lowlands of Lesotho.
2. To achieve between 0.50 tCO<sub>2</sub>e ha<sup>-1</sup> year<sup>-1</sup> and 17 tCO<sub>2</sub>e ha<sup>-1</sup> year<sup>-1</sup> of carbon sequestration depending on the tree species and up to 2 tCO<sub>2</sub>e ha<sup>-1</sup> year<sup>-1</sup> from grass species.
3. To reduce land degradation by increasing soil cover, productivity of the land, improving soil organic carbon, soil fertility and soil water holding capacity.

These carbon sequestration potentials can increase with growing biomass with age of trees. Agroforestry systems achieve carbon storage by increasing biomass carbon stocks, stored both below and above the ground.

### **Gender issues**

Agroforestry systems can produce a combination of crops including fruits and vegetables. Production of food commodities within the system will prevent women and girls from gathering wild fruits and

vegetables for their households. Agroforestry systems can also produce fuelwood which will make women and girls avoid collecting biomass for household consumption from the fields.

- It will be important that implementation of the agroforestry technologies consider the national ambitions of empowering women. This will include improving access to food and nutrition through production of fruits and vegetables. Provision of nutritious food is mainly a responsibility of women in the household.
- 

### 2.1.3.3 Actions and activities selected for inclusion in the TAP

#### *Summary of barriers and measures to overcome barriers*

Summary of barriers and measures for the agroforestry technology are listed in Table 2.9.

**Table 2.9: Measures identified to promote adoption of agroforestry technology in Lesotho**

Barrier type	Barriers	Measures
Financial and economic	Difficulty to getting funding for capital costs	The government has recently arranged with commercial banks to assist farmers with credits. This arrangement can be strengthened and improved
	Lack of funding from public and private sector	Systematic funding required
Market conditions	Lack of interest for local farmers to produce agroforestry systems as local market is served by imports from South Africa.	Improve markets for products of the technology.
Legal and regulatory	Lack of policy for this technology	Develop appropriate frameworks.
	Weak policy enforcement, monitoring and evaluation	Strengthen monitoring and evaluation, policy enforcement
	Poor land tenure systems in the country and lack of land titles	Land registration and titling required.
Network	Lack of participation of private sector, civil society and overall coordination	Improve coordination of activities associated with the technology.
Institutional and organizational capacity	Lack of research capacity, low research outputs and resources required to facilitate efficient implementation of technology	Improve research capabilities of national institutions and provide necessary resources
Human skills	Lack of human expertise associated with the technology	Development of strategies to improve and retain skilled human resources.
Social, cultural and behavioural	Community conflicts over resources and trespassing into protected resources especially during difficult times (i.e., during droughts)	Development of appropriate conflict resolution mechanisms is required.
Information and awareness	General lack of knowledge about agroforestry technologies in the country	Improve awareness of livelihood benefits of the technology.
Technical	Droughts and lack of water and inputs can reduce irrigation potential and productivity of the agroforestry systems.	Identify technologies that are resilient to local environmental conditions.
Other	Remote areas are inaccessible due to poor infrastructure and this can compromise technology implementation	Improve national infrastructure development and maintenance.
	Uncertainty due to climate change regarding suitability of technologies in the future	Conduct constant research to establish suitable future technologies.

### ***Actions selected for inclusion in the TAP***

Actions and activities for implementation of agroforestry technology are identified in the Table 2.10.

**Action 1:** Establish project implementation unit to manage TAP activities related to the agroforestry technologies. A project unit dedicated to the implementation of agroforestry TAPs will need to facilitate development of frameworks and soliciting predictable funding for the projects. The unit will coordinate TAP activities and engage with all stakeholders.

**Action 2:** Develop framework and regulations that are appropriate for successful implementation of the agroforestry technologies. Successful implementation of the TAPs will be made possible by having appropriate frameworks and regulations. The development of these frameworks and regulations will need full participation of all stakeholders so that they can be fully accepted.

**Action 3: Establish research areas focussing on agroforestry technologies.** Constant and focussed research will assist with collation of data and producing outcomes that will guide technology implementation and scaling up.

**Action 4: Implement pilot projects for agroforestry systems in the country.** Pilots during the initial phase of project implementation are important to generate data and information that can guide future scaling up of the agroforestry projects. Pilots are also important to lay groundwork and test efficiency of systems that may be used during implementation.

**Table 2.10: Actions and activities identified for implementation of agroforestry systems in Lesotho**

Actions	Activities
<b>Action 1:</b> Establish project implementation unit to manage TAP activities related to the agroforestry technologies.	1.1 Recruit staff that will work in the unit. 1.2 Engage with financial institutions to encourage them provide credits to farmers. 1.3 Exempt or reduce tax for private sector companies that support agroforestry systems. 1.4 Create enabling environment that promotes investments from the private sector.
<b>Action 2:</b> Develop framework and regulations that are appropriate for the successful implementation of the agroforestry technologies	2.1 Make it easier and cheap for farmers to safely lease or hire land for long periods. 2.2 Improve acquisition of title holding so that land can be used as collateral. 2.3 Demarcate (zone) pieces of land that can be used for agroforestry systems. This can primarily be degraded lands or pieces of land that may be at risk to degradation.
<b>Action 3:</b> Establish research areas focusing on agroforestry systems	3.1 Government to provide consistent funding for research and development. 3.2 Government, development partners and private sector to capacitate (human development, equipment and otherwise) research institutions. 3.3 Determine through research, appropriate agroforestry systems that are suitable to environmental conditions in Lesotho.
<b>Action 4:</b> Implement pilot projects for agroforestry systems in the country.	4.1 Identify farmers and locations to pilot the technology. 4.2 Provide farmers with inputs and trialled technologies. 4.3 Conduct monitoring and evaluation of the implemented technologies.

### ***Activities identified for implementation of selected actions***

The activities are identified and linked with actions in the Table above.

### ***Actions to be implemented as Project Ideas***

Actions 1 & 2 are identified to be implemented as project ideas. Barrier analysis work identified funding and land tenure as major challenges that prevent achievements in the agriculture sector in the country. Without consistent funding of projects, subsistence and emerging farmers cannot succeed in their ambitions. These farmers are resource poor and always rely on external support. Similarly, the current land tenure system in the country is not conducive to large scale production of any agricultural commodity. The government will need to develop a framework that will regulate leasing and hiring of



land between farmers. The aim of this action should be to remove or to significantly reduce business risks and barriers that are currently associated with land tenure system in the country.

All activities in these two actions will be considered in project ideas.

### ***Gender issues***

Actions can be designed to be gender responsive as females are to a measurable degree disadvantaged compared to males when it comes to land ownership in the country.

- It will be important that women and girls are well represented in all actions that will be implemented. They should be fairly represented in all stakeholder groups that will be involved when actions are implemented.
- Criteria that will be used throughout the lifetime of the agroforestry-related projects will need to ensure that women, girls and people with special needs are involved in all actions that will be implemented.
- It is important that data that will be collected during implementation of the actions should consider indicators that disaggregate between gender of the people involved in the projects.
- Monitoring and evaluation of the actions that will be implemented have to be gender sensitive.
- All actions that will be implemented will need to collect data throughout implementation period of the projects to enable research and documentation. Gender considerations will need to be taken care of during data collections. These data may include incorporation of women and girls as data collectors.
- All people (men, women and girls) will need to be trained for all the actions and activities they will be involved in – to increase their capacity. Gender experts need to be involved in the trainings and there has to be training modules that address gender issues in all the actions that will be implemented for the agroforestry TAPs.

Land reforms, formal and informal capacity building, as well as identification and allocation of pilot projects to farmers will need to consider fair share of female representation.

### **2.1.3.4 Stakeholders and timeline for implementation of TAP**

#### ***Overview of Stakeholders for the implementation of the TAP***

Several key stakeholders that can be involved in the implementation of agroforestry technologies, and their roles are identified in Table 2.11 Other stakeholders may still be added to the identified list.

**Table 2.11: Stakeholders and their roles in relation to implementation of agroforestry technologies**

Stakeholder	Roles
MFDP	<ul style="list-style-type: none"> <li>○ This Ministry is responsible for fiscal policy in the country. It determines subsidies and other financial incentives of the programmes.</li> <li>○ The Ministry is responsible for overall development framework of the country (i.e., NSDP II).</li> </ul>
MAFSN	<ul style="list-style-type: none"> <li>○ The Ministry is the custodian of agricultural activities in the country. It oversees production of crops and livestock throughout the country.</li> <li>○ The Ministry works with farmers and has direct contact with them and their associations. The Department of Extension Services can offer support services to the farmers during implementation of the technology.</li> <li>○ The Ministry often distributes farm inputs to the farmers at the beginning of the season. The Ministry provides advisory services to the farmers.</li> </ul>
Ministry of local government	<ul style="list-style-type: none"> <li>○ This Ministry is responsible for natural resources including land allocation at the local level.</li> <li>○ The Ministry implements applicable laws and regulations in their jurisdictions.</li> </ul>
Institutions of Higher Learning	<ul style="list-style-type: none"> <li>○ These institutions can provide training to farmers and students about the technology.</li> <li>○ These institutions can conduct research and trials for the technology before it is scaled out to farmers.</li> </ul>

Farmers and Farmer Associations	<ul style="list-style-type: none"> <li>○ Farmers that will be involved in the implementation of the technology.</li> <li>○ Some farmers have organized themselves into several associations. Farmers share experiences and lessons learned in these associations.</li> </ul>
NGOs & Civil societies	<ul style="list-style-type: none"> <li>○ These organizations operate within communities and are familiar with challenges experienced by farmers at the grassroots level.</li> <li>○ These organizations may be able to obtain funding from outside the country to implement the technologies.</li> <li>○ These organizations may have resources of their own that may be important in during the implementation of the technologies.</li> <li>○ Farmers and communities have trust in these organizations due to their long relationship.</li> </ul>
Private sector	<ul style="list-style-type: none"> <li>○ Private sector (financial institutions) can assist with credit facilities to the farmers to implement the technology.</li> <li>○ Private sector can implement technologies at a larger scale and can create business cases.</li> </ul>

### *Scheduling and sequencing of specific activities*

Table 2.12 below shows scheduling and sequencing of activities for the agroforestry technology.

**Table 2.12: Scheduling and sequencing for implementation of agroforestry technologies**

Actions	Activities	Year			
		1	2	3	4
<b>Action 1:</b> Establish project implementation unit to manage TAP activities related to the agroforestry technologies.	1.1. Recruit staff for the unit				
	1.2. Consultative meetings with financial institutions.				
	1.3. Consultative meetings with MFDP and Revenue Services Lesotho regarding tax exemptions.				
	1.4. Conduct policy discussions regarding investments required for the implementation of the technology.				
<b>Action 2:</b> Develop framework and regulations that are appropriate for the successful implementation of the agroforestry technologies	2.1. Engage in policy discussions regarding improvement of land tenure system in the country.				
	2.2. Conduct land assessment and its registration for title deeds.				
	2.3. In consultation with farmers and officials, identify land suitable for agroforestry technologies throughout the country.				

### *Gender issues*

Representation of stakeholders will be required to be gender inclusive in that:

1. **Inclusive Stakeholder Engagement:** All stakeholders will need to be involved during development of the TAP schedule. This will ensure that all gender-specific issues of the schedules can be effectively taken care of.
2. **Gender-Disaggregated Data Collection:** It is important that data collection schedules are data sensitive.
3. **Peer Review and Feedback:** TAPs implementation period has to include in its schedule of activities, a peer review and feedback session that considers needs of women and girls.

#### **2.1.3.5 Estimation of resources needed for action and activities**

##### *Estimation of capacity building needs*

The following capacity building needs for successful implementation of agroforestry systems to sequester carbon emissions in Lesotho are identified:

**Sustainable funding absorptive capacity:** National absorptive capacity of international funding needs to be improved. The country needs to develop capacity to source funding, to receive and manage it

effectively. This requires regulatory reforms, improvements of policies and related national development plans and identification of national investment priorities (AfDB, 2012).

**Integrated research programme:** There is a need to increase knowledge of agroforestry benefits throughout the technology value chain in the country. This can be achieved through establishment of research programme that will integrate biophysical and socioeconomic benefits of the technology. Capacity (human and technical) of research institutions in the country will need to be improved so that they can be able to develop appropriate products and solutions.

**Technology development:** To avoid reliance on imported technologies, the country needs to develop capacity to develop agroforestry technologies that are appropriate to national conditions. To achieve this, technology centres that can pioneer technology identification and development can be established within appropriate institutions.

**Extension services and farmers:** Agroforestry requires knowledge of complex agroecological systems and it is important that extension services and other relevant government departments are capacitated technically. Farmers will also need to be assisted to organize themselves into cooperatives that can grow this technology into sustainable commercial entities.

**Monitoring, reporting and verification:** MRV systems are important for successful implementation of mitigation technologies. Capacity building for MRV systems in agroforestry will assist provide visibility to the contributions that agroforestry makes to national climate change mitigation and will facilitate access to domestic and international sources of finance and other support (Rosenstock et al., 2019).

#### *Estimations of costs of actions and activities*

Cost estimations for the implementation of agroforestry technologies in Lesotho are listed in Table 2.13.

**Table 2.13: Costing of activities for implementation of agroforestry systems in Lesotho**

Actions	Activities	Costs (USD)
<b>Action 1:</b> Establish project implementation unit to manage TAP activities related to the agroforestry technologies.	1.1. Recruit staff that will work in the unit	188 889
	1.2. Develop a framework for subsidies and exemption or reduction of tax for private sector companies that support agroforestry systems.	1 667
	1.3. Create enabling environment to promote private sector investments.	5 556
<b>Action 2:</b> Develop framework and regulations that are appropriate for the successful implementation of the agroforestry technologies	2.1. Reform land tenure system in the country	5 556
	2.2. Improve acquisition of title holding for land to be used as collateral.	11 111
	2.3. Demarcate (zone) land that can be used for agroforestry systems.	55 556
<b>Action 3:</b> Establish research areas focusing on agroforestry systems	3.1 Provide consistent funding for research and development.	55 556
	3.2 Provide capacity building to research institutions.	16 667
	3.3 Research appropriate technologies that suites local conditions.	1 3889
<b>Action 4:</b> Implement pilot projects for agroforestry systems in the country.	4.1. Identify farmers that can pilot the technology.	4 444
	4.2. Train farmers and extension service officials for the technology.	2 778
	4.3. Provide piloting farmers with suitable technologies.	3 333 333
	4.4. Conduct monitoring and evaluation systems for the technologies.	5 556
	4.5. Document and share lessons learned.	2 778
<b>Total</b>		<b>3 703 333</b>

#### *Gender issues*

For this technology, financial support should aim to uplift female farmers. A mechanism will need to be developed to enable provision of support preference to women. This preference will basically apply to all activities identified in the table above.

- It will be important that estimation of resources needed for implementation of action and activities is cognisant of gender requirements. Additional requirements that may arise because of gender will need to be identified and resources be estimated and provided for.
- Gender-sensitive criteria must be used when estimating for resources that may be required during implementation of the TAPs.
- All genders and age groups will need to be consulted during estimation of the resources that will be required during TAP implantation. Fair representation of women and girls in the stakeholder groups will need to be considered.
- Estimates of resources that are required for data collection during implementation of TAPs need to be disaggregated by gender and to have gender-specific parameters and indicators. These can include data on number of agroforestry-specific resources that may be provided to men, women and the youth.
- It will be important that reporting of case studies and lessons learned from implementation of agroforestry TAPs include gender-specific indicators and parameters. These can include reporting on number of trees, seeds and other resources that may be allocated to women, men and the youth.

### 2.1.3.6 Management planning

#### *Risks and contingency planning*

Risks and contingency plans for agroforestry technologies are listed in Table 2.14.

**Table 2.14: Identified risks and contingency plans**

Type of risk	Description of risk	Contingency actions
Cost	It is possible that costs may increase before the technology is fully implemented.	The government needs to ensure timely and efficient implementation of the technology.
Yield	Environmental and management factors may cause the technology to provide low yield.	Make optimum inputs available to the farmers and provide support and training to the farmers so that obtain effective management.
Scheduling	Implementation of the technology may be delayed due to lengthy logistics around acquisition of land.	The government needs to provide working mechanisms when it resolves land tenure issue.
	There may be delays in the provision or availability of inputs for the technology in the market.	Suitable technology inputs (i.e., crop varieties) will need to be identified and documented so that they can be sourced and made available in the market.
Finance	The government may not have budget to fully implement this technology.	The government will need to engage with development partners and other potential funders for possible funding.
Inputs	There is possible importation or smuggling or wrong technology that may further harm the environment.	Increase surveillance and monitoring at the ports of entry to the country. Develop standards for the adopted technologies.

#### *Next Steps*

Immediate requirements that need to be in place for successful implementation of agroforestry are:

- Reform of land tenure in the country. Current risks associated with leasing of agricultural land in the country will prevent large scale adoption and possible commercialization of the technology.

- ii. Identification of technologies that are suitable to local conditions. This will assist prevention of adoption and implementation of substandard and unsuitable technologies, including their imports.
- iii. Provision of financial resources and technical assistance to the farmers. This is required mainly because farmers may not be able to afford upfront costs of the technologies.

Critical steps to succeed include:

- i. Strengthening of institutions (public, research, etc) that will support implementation of the technology
- ii. Capacity building of human resources including farmers
- iii. Development of guidelines that will farmers during implementation and management of the technologies
- iv. Identification of farmers and locations in the country that will implement the technology

### ***Gender issues***

It is important that management and planning for the technologies considers gender issues. Gender issues for management planning include the following:

- Recruitment of staff personnel that will work with agroforestry technologies should consist of both men and women. It will be important that among the staff personnel be gender expert that can lead the gender related issues.
- Capacity building for staff should have modules on gender issues that are related to agroforestry TAPs.
- Project management and planning activities must be cognisant of gender issues when implementing the activities.
- Project stakeholders, including beneficiaries of the agroforestry technologies will need to consist of women and men. Project managers must ensure that women and girls have fair representation in all stakeholder groups involved in the agroforestry activities.
- Management and planning of agroforestry activities need to have monitoring and reporting on gender issues. Reporting can consider success rates of agroforestry projects managed by women and men separately.

### **2.1.3.7 Reporting**

#### ***Completed TAP tables***

The TAP table is presented Table 2.15 below.

#### ***Gender issues***

The information presented in Table 2.15 will to the extent possible, consider gender issues. The reporting will be done by the technology implementation unit. Project reporting needs to have information on all gender issues and aspects, including, reporting on capacity building activities that will be done during implementation of the projects.

Other important aspects of the agroforestry technologies that will need thorough reporting are 1) number of women and girls beneficiaries, 2) specific work allocated and done by women and girls, 3) estimates of resources given to women and girls during the implementation of the projects.

**Table 2.15: Overview table for agroforestry systems to sequester carbon emissions**

TAP overview table								
<b>Sector</b>	Agriculture, Forestry and Other Land Use							
<b>Sub-sector</b>	Agroforestry							
<b>Technology</b>	Carbon sequestration through agroforestry systems							
<b>Ambition</b>	5. A plantation of 1 000 ha of agroforestry systems that consists of forests and fodder grasses in four years in the lowlands of Lesotho. 6. To achieve between 0.50 tCO <sub>2</sub> e ha <sup>-1</sup> year <sup>-1</sup> and 17 tCO <sub>2</sub> e ha <sup>-1</sup> year <sup>-1</sup> of carbon sequestration depending on the tree species and up to 2 tCO <sub>2</sub> e ha <sup>-1</sup> year <sup>-1</sup> from grass species. 7. To reduce land degradation by increasing soil cover, productivity of the land, improving soil organic carbon, soil fertility and soil water holding capacity.							
<b>Benefits</b>	<b>The implemented agroforestry technologies will benefit emerging farmers throughout the country to produce fodder for their livestock, food for their families and to rehabilitate degraded lands.</b>							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (years)	Risks	Success criteria	Indicators for monitoring of implementation	Budget per activity (USD)
<b>Action 1: Establish project implementation unit to manage TAP activities related to the agroforestry technologies.</b>	<b>Activity 1.1</b> Recruit staff that will work in the unit	<ul style="list-style-type: none"> <li>GoL</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	1-2	<ul style="list-style-type: none"> <li>Lack of interest from private sector / financial institutions.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of credits by financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>Number of meetings held</li> </ul>	188 889
	<b>Activity 1.2</b> Develop a framework for subsidies and exemption or reduction of tax for private sector companies that support agroforestry systems.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	1-2	<ul style="list-style-type: none"> <li>Lack of participation of stakeholders.</li> <li>Lack of political will</li> </ul>	<ul style="list-style-type: none"> <li>Availability of framework</li> </ul>	<ul style="list-style-type: none"> <li>Number of meetings / workshops held</li> </ul>	1 667
	<b>Activity 1.3</b> Create policy that promotes investments from the private sector.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	1-2	<ul style="list-style-type: none"> <li>Lack of participation of stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Availability of policy</li> </ul>	<ul style="list-style-type: none"> <li>Number of meetings / workshops held</li> </ul>	5 556
<b>Action 2: Develop framework and regulations that are appropriate for the successful implementation of the agroforestry technologies</b>	<b>Activity 2.1</b> Reform land tenure system in the country.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	1-3	<ul style="list-style-type: none"> <li>Lack of participation of stakeholders.</li> <li>Prolonged process</li> </ul>	<ul style="list-style-type: none"> <li>Reformed land tenure system</li> </ul>	<ul style="list-style-type: none"> <li>Number of meetings / workshops held</li> </ul>	5 556
	<b>Activity 2.2</b> Improve acquisition of title holding so that land can be used as collateral.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	1	<ul style="list-style-type: none"> <li>Lack of resources</li> <li>Unregistered land</li> </ul>	<ul style="list-style-type: none"> <li>Increased number of title holdings given out</li> </ul>	<ul style="list-style-type: none"> <li>Title holding technology development</li> </ul>	11 111
	<b>Activity 2.3</b> Demarcate (zone) pieces of land that can be used for agroforestry systems.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> </ul>	MAFSN	3-4	<ul style="list-style-type: none"> <li>Lack of resources</li> <li>Lack of baseline data</li> </ul>	<ul style="list-style-type: none"> <li>Demarcated / zoned agroforestry land</li> </ul>	<ul style="list-style-type: none"> <li>Pieces of land demarcated</li> </ul>	55 556
<b>Action 3: Establish research areas focusing on agroforestry systems</b>	<b>Activity 3.1</b> Provide consistent funding for research and development.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of funders / funding</li> <li>Lack of funding program</li> </ul>	<ul style="list-style-type: none"> <li>Amount of funding provided</li> </ul>	<ul style="list-style-type: none"> <li>Amount of funding provided</li> </ul>	55 556

		<ul style="list-style-type: none"> <li>Private sector / financial institutions</li> <li>Research institutions</li> </ul>						
	<b>Activity 3.2</b> Provide capacity building (human development, equipment and otherwise) to research institutions.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> <li>Research institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of trainees</li> <li>Lack of resources</li> <li>Lack of trainers / experts</li> </ul>	<ul style="list-style-type: none"> <li>Number of people trained</li> </ul>	<ul style="list-style-type: none"> <li>Number of people trained</li> </ul>	16 667
	<b>Activity 3.3</b> Determine through research, appropriate agroforestry systems that are suitable to environmental conditions in Lesotho.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> <li>Research institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of resources</li> <li>Lack of expertise</li> </ul>	<ul style="list-style-type: none"> <li>Agroforestry systems determined per agroecological zone</li> </ul>	<ul style="list-style-type: none"> <li>Research outputs produced</li> </ul>	1 3889
<b>Action 4: Implement pilot projects for agroforestry systems in the country.</b>	<b>Activity 4.1</b> Identify farmers that can pilot the technology.	<ul style="list-style-type: none"> <li>GoL</li> <li>Research institutions</li> </ul>	MAFSN	1-2	<ul style="list-style-type: none"> <li>Lack of interest from farmers</li> </ul>	<ul style="list-style-type: none"> <li>Number of farmers identified for pilot</li> </ul>	<ul style="list-style-type: none"> <li>Number of farmers identified / registered for pilot</li> </ul>	4 444
	<b>Activity 4.2</b> Train farmers and extension service officials for the technology.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> <li>Research institutions</li> </ul>	MAFSN	1-3	<ul style="list-style-type: none"> <li>Lack of interest from farmers</li> <li>Lack of interest from extension service officers</li> <li>Lack of trainers / expertise</li> </ul>	<ul style="list-style-type: none"> <li>Number of farmers and extension service officials trained</li> </ul>	<ul style="list-style-type: none"> <li>Number of farmers and extension service officials trained</li> </ul>	2 778
	<b>Activity 4.3</b> Provide piloting farmers with technologies suitable for their locations.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Private sector / financial institutions</li> <li>Research institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of standards for technologies</li> <li>Lack of technology guidelines</li> <li>Lack of resources</li> </ul>	<ul style="list-style-type: none"> <li>Number of successful pilot technologies</li> </ul>	<ul style="list-style-type: none"> <li>Number of successful pilot technologies</li> </ul>	3 333 333
	<b>Activity 4.4:</b> Conduct monitoring and evaluation for the implemented technologies.	<ul style="list-style-type: none"> <li>GoL</li> <li>Research institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of resources</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and evaluation reports</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and evaluation reports</li> </ul>	5 556
	<b>Activity 4.5:</b> Document lessons learned and share them using appropriate platforms.	<ul style="list-style-type: none"> <li>GoL</li> <li>Development partners</li> <li>Bilateral / multilateral institutions</li> <li>Research institutions</li> </ul>	MAFSN	1-5	<ul style="list-style-type: none"> <li>Lack of data / information collection</li> <li>Lack of participation in relevant platforms</li> </ul>	<ul style="list-style-type: none"> <li>Number of documented and shared lessons</li> </ul>	<ul style="list-style-type: none"> <li>Lessons shared</li> </ul>	2 778

### 2.1.3.8 Tracking the implementation status of the TAP

#### *Rationale, responsibility and content of TAP tracking*

It will be important that implementation of this technology is tracked throughout the lifetime of the project. Like the biogas digester technology, it is important that the government sets up a monitoring system for this and all other technologies. The system will have to consider and use all relevant skill sets that exists in the country.

Implementation of the agroforestry technology TAPs in Lesotho will need institutional arrangements that will include setting up of a unit and a system that will track their status. The technologies will need to be active and efficient so that they can be able to achieve carbon sequestration and other social benefits. The TAPs will need an implementation program that will enable collection of quality data, empowerment of women and girls, and documentation of lessons learned.

While the biogas technology will be implemented by the MAFSN who deal directly with the farmers, the MEF and MICSTI are key ministries because they are climate change focal point and custodian of technology development and innovation in the country. They will be responsible for overall registration of mitigation technologies of which agroforestry technologies achieve. The centralized registration of the technologies will assist with the establishment of focussed institutional set up.

The Ministry of Environment and Forestry is the national focal point for all climate change issues. The TNA and TAP process are part of the broader climate change issues under the UNFCCC and their tracking and implementation status may have to be reported to the Secretariat of the Convention. The reporting and contents thereof will be according to the requirements of the Convention. The information that will need to be tracked or reported on include:

- Challenges including barriers encountered during implementation of the agroforestry projects.
- Strategies identified or used to address the identified challenges and barriers.
- Linkages of biogas TAPs to other national plans.
- Next steps needed by the agroforestry TAPs and resources required.

#### *Gender issues*

It will be important that implementation of this technology promotes involvement of women and girls at all levels of the work that will be done. The following issues will need to be tracked:

1. Keeping track that gender requirements associated with the technology are addressed
2. Keeping track that capacity building programs aimed for women and girls are implemented effectively
3. It will be important that monitoring and evaluation activities of the project are tracked with a close focus on gender related issues
4. Data collection activities throughout implementation of the project will need to track involvement of women and girls in all project ideas

### 2.1.4 Project Idea 2-I: Biogas digesters in smallholder mixed farming

**Specific Project Idea I:** small-scale biogas and homestead vegetable production in a mixed (crop and livestock) agricultural system.

**Table 2.16: Specific Project idea for installations of biogas digesters in mixed farming – Project idea 1**

<b>Sector</b>	<b>AFOLU</b>
<b>Subsector</b>	<b>Livestock</b>



<b>Technology Name</b>	<b>Biogas digesters</b>
Project Name	Small-scale biogas and homestead vegetable production in a mixed (crop and livestock) agricultural system
Introduction / Background	<p>Farmers in Lesotho produce both livestock and crops. The production is subsistence with most farmers owning few cattle, sheep and goats. These livestock is kept in kraals (enclosure) at night.</p> <p>Animal manure produces GHG emissions (CH<sub>4</sub> and N<sub>2</sub>O) depending on how they are managed. Cattle dung is also used for fuel in the homesteads. This form of energy is not sustainable and results in poor air quality in the homes.</p> <p>Biogas digesters are anaerobic systems that produce sustainable energy from agricultural and other organic waste. This technology can also reduce work done particularly by women and girls to collect biomass for fuel in the homes. Biogas slurry can be used as organic manure in the gardens and orchards.</p> <p>Barriers that can affect wider implementation of this technology include large capital costs, lack of public and private sector support as well as absence of policy and framework to regulate the technology to ensure efficiency and quality installations.</p>
Objectives	<p><b>Primary Objective:</b></p> <ul style="list-style-type: none"> <li>• The primary objective of this project idea is to reduce GHG emissions from animal manure and any other organic waste.</li> </ul> <p><b>Secondary Objectives:</b></p> <ul style="list-style-type: none"> <li>• Produce sustainable energy in smallholder farming households</li> <li>• Improve air quality by changing from traditional burning of dry cow dung.</li> <li>• Provide job opportunities to local communities during installations and through maintenance.</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Conduct pilot projects in the lowlands of the country to assess efficiency of the technology and to gather data for future scaling up of the technology.</li> <li>• Develop installation and maintenance capacity about this technology in local communities.</li> <li>• Reduce energy costs for beneficiaries during operations phase of the technology.</li> </ul>
Relationship to the country's Sustainable Development Priorities	<ul style="list-style-type: none"> <li>• The NSDP II (2018/19 – 2022/23) (Lesotho, 2018), NCCP (2017 – 2027) (LMS, 2017) and the National Energy Policy recommend implementation of the technology for provision of sustainable energy and GHG mitigation.</li> <li>• The project will support the country to achieve SDG 7 and SDG 13 by providing communities with affordable sustainable energy.</li> </ul>
Project Deliverables	<ul style="list-style-type: none"> <li>• Pilot study report containing baseline data about the technology at different locations in the lowlands of the country.</li> <li>• Conferences and meetings to discuss lessons learned on the pilot projects.</li> <li>• Distribution of installation equipment to the identified beneficiaries.</li> <li>• Monitoring and evaluation of the on the pilot installations and performance of the technologies.</li> </ul>
Project Scope and Possible Implementation	<p><b>Geographical Focus:</b> Installations to be focussed in the lowlands of the country.</p> <p><b>Implementation Strategy:</b> The project will need collaboration between MICSTI, MAFSN, local government structures, civil society and farmers.</p> <p><b>Stakeholder Engagement:</b> Engage community leaders, farmers, civil society, gender groups and experts, local businesses and artisans.</p> <p><b>Preparation Phase (Months 1-3):</b></p> <ul style="list-style-type: none"> <li>○ Conduct stakeholder engagements</li> <li>○ Identify project beneficiaries.</li> <li>○ Finalize project design and budget.</li> </ul> <p><b>Implementation Phase (Months 4-24):</b></p> <ul style="list-style-type: none"> <li>○ Procure prefabricated or build bricks and mortar biogas units for identified beneficiaries.</li> <li>○ Through the Extension Services and civil organizations, distribute stoves and conduct training sessions for beneficiaries.</li> <li>○ Monitor installations and collect data</li> </ul> <p><b>Evaluation Phase (Months 25-36):</b></p>

	<ul style="list-style-type: none"> <li>○ Assess mitigation potential of the installed technologies.</li> <li>○ Assess social impact of the technology.</li> </ul>
Project Activities	<p><b>Preparation Phase (Months 1-3):</b></p> <ul style="list-style-type: none"> <li>• Sensitize stakeholders and identify beneficiaries</li> <li>• Finalize project design, budget, and procurement plan.</li> </ul> <p><b>Implementation Phase (Months 4-24):</b></p> <ul style="list-style-type: none"> <li>• Procure biogas units for prefabricated systems (if it becomes a selected technology).</li> <li>• Procure equipment for brick and mortar (if it becomes a selected technology)</li> <li>• Distribute units and equipment to the beneficiaries.</li> <li>• Conduct training sessions for artisans and beneficiaries about installations and on how to operate and maintain the technology.</li> </ul> <p><b>Evaluation Phase (Months 25-36):</b></p> <ul style="list-style-type: none"> <li>• Assess efficiency and mitigation potential of the technology.</li> <li>• Assess social benefits of the technology.</li> </ul>
Timelines	Implementation period is projected to be 36 months.
Budget / Resource Requirements	<p><b>Estimated Budget:</b> USD 210 556 (see Table 2.6)</p> <p><b>Funding Sources:</b> Seek funding from international donors, government grants and partnerships with private sector entities. Government can consider subsidies as it will be difficult for beneficiaries to raise the required capital.</p>
Measurement / Evaluation	<p>Evaluation of the project will consider the following:</p> <ul style="list-style-type: none"> <li>• Number of biogas digesters successfully installed</li> <li>• Amount of GHG emissions abated by the use of biogas digesters</li> <li>• Amount of money saved by the households by not buying fuel to cook</li> </ul>
Complications / Challenges	<p>Complications and challenges include the following:</p> <ul style="list-style-type: none"> <li>• Beneficiaries raising capital for installations if technologies are not subsidized</li> <li>• Frequent breakages and high maintenance costs if installations become poor</li> <li>• Control in the ports of entry to prevent imports of substandard units</li> </ul>
Responsibilities and Coordination	<p><b>Lead Organization:</b> Ministry of Environment and Forestry</p> <p><b>Collaborating Partners:</b> Local civil society organizations, government departments, farmers, biogas digester unit manufacturers, and community leaders.</p> <p><b>Coordination:</b> Regular coordination meetings, site visits and reporting mechanisms to make sure that the biogas digester installations work efficiently.</p>

**Table 2.17: Specific Project Idea for carbon sequestration through agroforestry systems – Project idea 2**

<b>Sector</b>	<b>AFOLU</b>
<b>Subsector</b>	<b>Crops and forest</b>
<b>Technology Name</b>	<b>Agroforestry</b>
Project Name	Production of agroforestry systems to sequester carbon and prevent land degradation.
Introduction / Background	<p>Lesotho's landscape is complex and consists of sloping lands that make soil susceptible to erosion by waste and wind. There is constant soil erosion and loss of topsoil throughout the country.</p> <p>Poor land management practices further promote soil erosion and land degradation. As a result, land productivity has declined over time. Land degradation has become a major environmental challenge that continues to reduce potential of land resources to sequester carbon in the country.</p> <p>Agroforestry systems have potential to sequester carbon, improve soil fertility and underground water resources, increase food security and nutrition, and produce fodder for animals.</p> <p>In addition to high capital costs associated with agroforestry systems, land tenure system and absence of land titles are key barriers that can prevent successful implementation of this technology.</p>
Objectives	<p><b>Primary Objective:</b></p> <ul style="list-style-type: none"> <li>• The primary objective of this project idea is to increase carbon sinks through production of agroforestry systems in the country</li> </ul> <p><b>Secondary Objectives:</b></p> <ul style="list-style-type: none"> <li>• Prevent land degradation</li> </ul>

	<ul style="list-style-type: none"> <li>• Improve soil fertility and local ground water resources</li> <li>• Improve household food and nutrition security</li> <li>• Produce animal fodder</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Conduct pilot projects in the lowlands to establish efficiency of the technology</li> <li>• Improve climate resilient land systems that can sustain crop production</li> <li>• Increase household food security and production of fodder for animals</li> </ul>
Relationship to the country's Sustainable Development Priorities	<ul style="list-style-type: none"> <li>• Agroforestry systems are encouraged by the NSDP II (2018/19 – 2022/23) (Lesotho, 2018) and NCCP (2017 – 2027) (LMS, 2017) and other national plans</li> <li>• Agroforestry systems assist the country to achieve SDG 2 by increasing food and nutrition security</li> </ul>
Project Deliverables	<ul style="list-style-type: none"> <li>• Project report that contains baseline information and the status of the land and social conditions after project implementation</li> <li>• Quantification of carbon sequestered by the agroforestry projects</li> <li>• Regular conferences and meetings to discuss project progress and lessons learned</li> <li>• Identification of project sites and production of agroforestry plantations</li> <li>• Monitoring and evaluation of the agroforestry plantations</li> </ul>
Project Scope and Possible Implementation	<p><b>Geographical Focus:</b> Installations to be focussed in different parts of the country.</p> <p><b>Implementation Strategy:</b> The project will need collaboration between MEF, MICSTI, MAFSN, local government structures, research institutions, civil society and farmers.</p> <p><b>Stakeholder Engagement:</b> Engage community leaders, farmers, civil society, gender groups and experts, researchers and local businesses</p> <p><b>Preparation Phase (Months 1-4):</b></p> <ul style="list-style-type: none"> <li>○ Conduct stakeholder engagements</li> <li>○ Identify project beneficiaries.</li> <li>○ Finalize project design and budget.</li> </ul> <p><b>Implementation Phase (Months 5-36):</b></p> <ul style="list-style-type: none"> <li>○ Identify and secure land where agroforestry productions will be made</li> <li>○ Procure production inputs</li> <li>○ Distribute inputs and grow agroforests</li> <li>○ Monitor installations and collect data</li> </ul> <p><b>Evaluation Phase (Months 37-48):</b></p> <ul style="list-style-type: none"> <li>○ Assess mitigation potential of the planted agroforests</li> <li>○ Assess social impact of the technology.</li> </ul>
Project Activities	<p><b>Preparation Phase (Months 1-4):</b></p> <ul style="list-style-type: none"> <li>• Sensitize stakeholders and identify beneficiaries</li> <li>• Finalize project design, budget, and procurement plan.</li> </ul> <p><b>Implementation Phase (Months 5-36):</b></p> <ul style="list-style-type: none"> <li>• Identify and secure land for agroforestry productions</li> <li>• Procure production inputs</li> <li>• Conduct training sessions for farmers about the technology</li> <li>• Collection of production data</li> </ul> <p><b>Evaluation Phase (Months 37-48):</b></p> <ul style="list-style-type: none"> <li>• Assess mitigation potential of the agroforestry technology.</li> <li>• Assess social and other co-benefits of the technology.</li> </ul>
Timelines	Implementation period is projected to be 48 months.
Budget / Resource Requirements	<p><b>Estimated Budget:</b> USD 3 703 333 (see Table 2.13)</p> <p><b>Funding Sources:</b> Seek funding from the government, international donors and partnerships with private sector entities.</p>
Measurement / Evaluation	<p>Evaluation of the project will consider the following:</p> <ul style="list-style-type: none"> <li>• Number of agroforestry systems successfully produced in the country</li> <li>• Amount of GHG emissions sequestered by agroforestry systems</li> <li>• Amount of money saved by the households by not buying certain food items</li> </ul>
Complications / Challenges	<p>Complications and challenges include the following:</p> <ul style="list-style-type: none"> <li>• Beneficiaries raising capital for installations if technologies are not subsidized</li> <li>• Difficulties to secure enough land for farmers to produce at profitable scale</li> </ul>

	<ul style="list-style-type: none"> <li>• Potential prolonged droughts and floods that may affect productions</li> </ul>
Responsibilities and Coordination	<p><b>Lead Organization:</b> Ministry of Environment and Forestry</p> <p><b>Collaborating Partners:</b> Local civil society organizations, government departments, farmers, biogas digester unit manufacturers, and community leaders.</p> <p><b>Coordination:</b> Regular coordination meetings, site visits and reporting mechanisms to make sure that agroforestry systems are produced efficiently.</p>

## Chapter 3 Crosscutting Issues

The following are the main cross-cutting issues associated with the Technology Action Plan for Mitigation:

- Reduction of deforestation is an issue of national priority because of its linkage to enhancing rain-producing processes and combating desertification.

In this regard, the wider use of efficient cookstoves as sources of energy in rural areas also addresses deforestation and desertification issues.

- Women are usually at the forefront of social and economic activities in rural areas. These activities include gathering and carrying heavy loads of firewood, food production, preservation, and storage. These issues are directly and indirectly addressed by the action plan in terms of reducing the workloads of rural women.
- Rural poverty is often associated with dependence on a single economic activity. Economic diversification is one of the ways of poverty reduction. This issue is addressed in the action plan in that the identified sources of energy provide opportunities for diversified income generation.
- Children in rural areas are the most affected by poor lighting conditions in their homes because they do their homework in the evenings. This issue is addressed by the action plans for Solar PV Minigrids since the main goal is to improve lighting in rural households.

### **Policy and Regulatory Frameworks:**

- **Harmonization:** Ensuring coherence and alignment of policies and regulations across different sectors (energy, environment, finance) to support the adoption and scaling of climate-friendly technologies.
- **Incentives and Subsidies:** Designing effective incentive mechanisms, subsidies, and financing schemes to make technologies like efficient cookstoves, solar PV minigrids, and energy-efficient appliances affordable and attractive to end-users.

### **Capacity Building and Awareness:**

- **Training and Skills Development:** Building local capacity through training programs for technicians, installers, and users to ensure proper installation, operation, and maintenance of technologies.
- **Public Awareness:** Conducting awareness campaigns to educate communities about the benefits of adopting climate-friendly technologies and promoting behavioural changes.

### **Financial Mechanisms and Investment:**

- **Access to Finance:** Addressing barriers to accessing finance for technology deployment, including securing loans, grants, and investments for infrastructure development and technology adoption.
- **Risk Management:** Mitigating financial risks associated with technology deployment through innovative financing mechanisms and risk-sharing arrangements.

### **Monitoring, Evaluation, and Data Management:**

- **Data Collection and Analysis:** Establishing robust systems for monitoring and evaluating the performance and impact of technologies on climate change mitigation goals.
- **Knowledge Sharing:** Promoting knowledge sharing and collaboration among stakeholders to facilitate learning from successful implementations and addressing challenges.

### **Community Engagement and Social Acceptance:**

- **Local Context:** Recognizing and integrating local knowledge, preferences, and cultural practices into technology design and implementation processes.
- **Social Equity:** Ensuring equitable distribution of benefits and addressing social barriers to technology adoption, particularly for marginalized communities.

**Gender issues:** Incorporating gender considerations in the reporting of TAP project ideas will be essential to ensure that initiatives are gender-responsive and promote equitable outcomes.

- **Gender Analysis Requirement:** Making it a requirement for project proposers to conduct a gender analysis as part of their project idea reporting. This analysis should identify the gender-specific needs, priorities, and constraints related to the proposed project, as well as strategies for addressing them.
- **Gender-Sensitive Criteria:** Creating evaluation criteria that consider gender perspectives when assessing TAP project ideas. Evaluating project proposals based on their capacity to tackle gender inequalities, empower women, and encourage inclusivity and engagement across various gender identities.
- **Inclusive Stakeholder Engagement:** Encouraging project proposers to engage with diverse gender groups throughout the project ideation and reporting process. Consult with women, men, and other gender-diverse stakeholders to gather input, feedback, and insights that inform the development of gender-responsive project ideas.
- **Gender-Disaggregated Data Collection:** Mandating that project proposers to gather and report gender-disaggregated data on project impacts, outcomes, and beneficiaries. This data should provide insight into how the proposed project will affect different gender groups and enable monitoring and evaluation of gender-related outcomes over time.
- **Capacity Building:** Offering capacity-building support to project proposers on gender mainstreaming and gender-responsive project design. Providing training on gender analysis, gender-sensitive reporting, and best practices for promoting gender equality and social inclusion within TAP projects.
- **Peer Review and Feedback:** Establishing mechanisms for peer review and feedback on project ideas, including gender experts or reviewers with expertise in gender mainstreaming. Encouraging reviewers to assess the extent to which project ideas incorporate gender considerations and provide constructive feedback for improvement.
- **Monitoring and Reporting Requirements:** Including specific requirements for monitoring and reporting on gender-related indicators and outcomes throughout the project lifecycle. This may include regular progress reports, gender-sensitive impact assessments, and case studies highlighting gender-responsive practices and lessons learned.

Incorporating gender considerations into the reporting of TAP project ideas ensures that initiatives in Lesotho are developed and executed in ways that promote gender equality, social inclusion, and sustainable development.

Addressing these cross-cutting issues requires a coordinated approach involving government agencies, private sector entities, development partners, civil society organizations, and local communities. By

addressing these challenges holistically, the Technology Action Plan for climate change mitigation in Lesotho can achieve sustainable and impactful outcomes across various technology sectors.

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## Annex I: List of Stakeholders Involved and Their Contacts

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