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Mobilising Renewable Energy Investments

The opportunity for Lesotho's financial institutions to invest in green energy

GET.invest Lesotho – EDGE Finance

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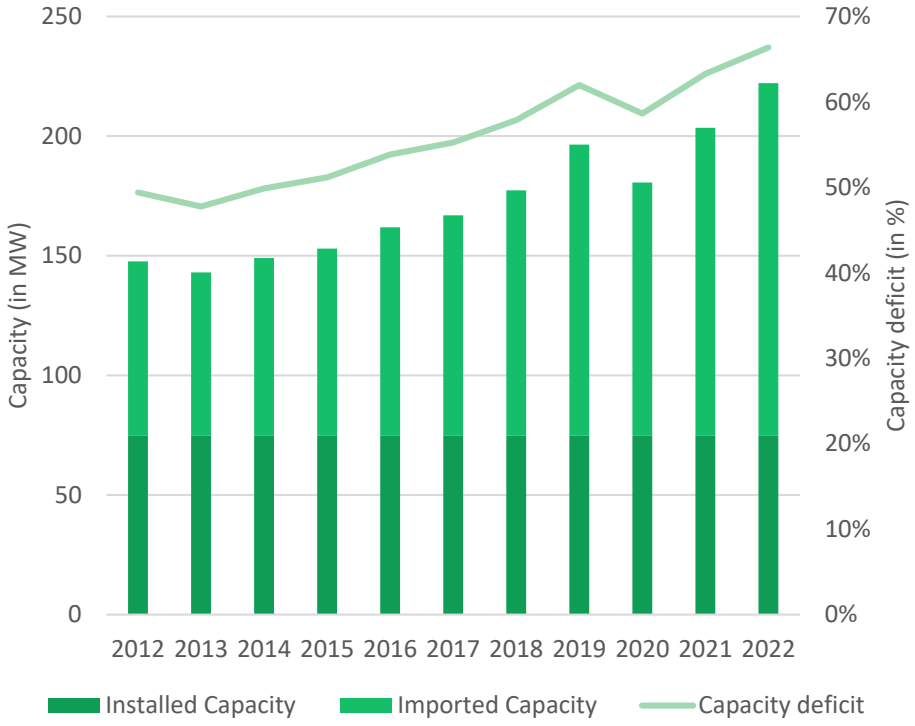
Lesotho's power market

FIGURE 1: Lesotho power demand and supply profile



Overview:

- **National energy consumption**: predominance of traditional biomass energy (esp. rural households) + heavy dependence on imported petroleum
- **Installed power capacities**: 102 MW (hydro + solar) versus peak demand of 203 MW, i.e. **50% capacity deficit**
- **Deficit is filled by imports mainly from South Africa**
- **Significant RE potential:** 6000 MW wind + solar; 4000 pump storage; > 1600 MW hydropower, of which 360 MW small hydropower plants (<10 MW)
- **Electrification rate of 50% (2022)**

TABLE 1: Key market statistics

Peak electricity demand	203 MW
Electricity consumption	970 GWh (438 GWh imported)
Grid connected capacity	**LHDA (Lesotho Highlands Development Authority)** • Muela Hydro – 72 MW **LEGCO (Lesotho Electricity Generation Company)** • Solar PV – 30 MW (being commissioned in 2024)
Off-grid capacity	**OnePower Pty Ltd (IPP)** • Ha Makeba mini-grid – 50 kW • Sotho mini-grids Portfolio: 3 out of 11 mini-grids are operational

Lesotho's financial market

FIGURE 2: Lesotho's banking sector

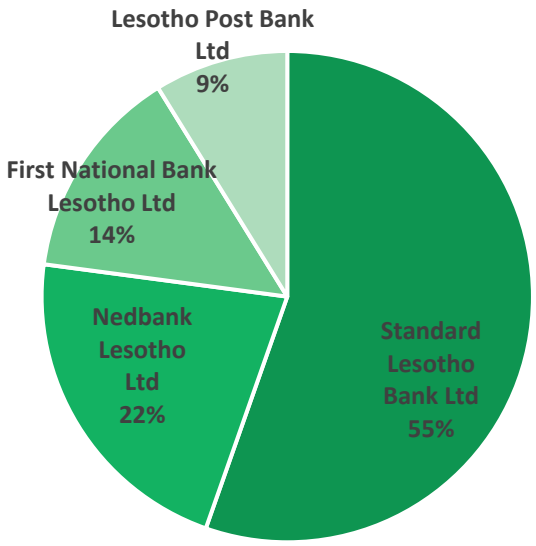
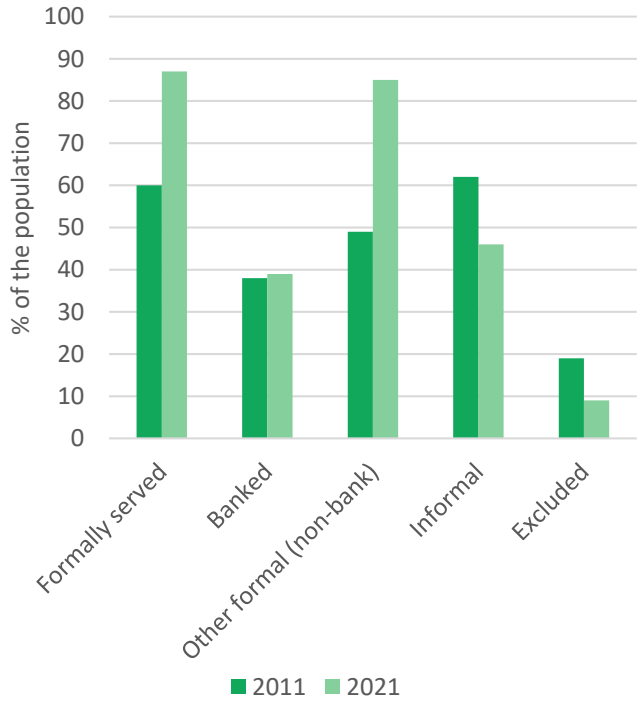


FIGURE 3: Financial products uptake



Overview

- The banking sector consists of four licensed commercial banks that hold LSL 27,599 Bn. assets (EUR1.34 Bn.)
- There are 151 licensed MFIs in Lesotho
- Credit to the private sector is 22.84% with an annual credit growth of 8.78%.
- Monetary policy tightening led to a decline in nonperforming loans from 4.2% of gross loans in 2020 to 3.84% in December 2023 (below the Southern Africa average of 6.44%).
- Lesotho is one of the most financially included countries in Southern Africa. Approximately 91% are financially included (formal financial inclusion increased to 87% in 2021, strongly driven by vast uptake of non-bank formal products like mobile money)
  - About 39% of adults are banked (steady over the past decade)
  - There is high uptake of savings group (15%) whilst usage of cooperatives (2%) and MFIs (2%) is still low.
  - In 2021, remittances increased to 72% percent of adults, representing a 41% increase compared to 2021.

Self-consumption C&I: Lack of grid reliability can make investments in solar PV profitable

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Overview

- C&Is are **not required to apply for any license** to generate electricity.
- The national regulation foresees a net-metering scheme for embedded generation projects of < 500 kW, but regulations are not yet in place.
- 74% of grid connected consumers suffer from **unreliable power supply** (50% grid availability for 22%; 25% grid availability for 54%).
- The estimated levelized cost of energy **(LCOE) of solar PV is significantly lower** then the LCOE for grid power **when 20% diesel** are included.
  - For all grid-connected C&I that rely **by 20% on diesel generators, an investment can be very profitable**.
  - For C&Is, who have a **very reliable grid supply (100% grid), the investment in solar PV is NOT profitable**.
- The investment in **solar PV does mostly make sense for small-scale C&Is** due to prices for electricity with a power load of <25kVA (Commercial) and <50kVA (Industrial).
- For larger-scale C&Is, the investment can become profitable if:
  - The **share of diesel power is higher** (e.g. 30%)
  - The **costs of installation are lower** (e.g. EUR 800 / kWp instead of EUR 900, due to scale)

TABLE 2: Estimation of market size

MARKET SIZE	
Investment costs per kWp	EUR 900
Average number of installations (based on past 5 years)	5
Average installed capacity of feasible solar PV system	75 kWp
MARKET POTENTIAL UNTIL 2030	**EUR 1.7 MIO.**

Foto: SolidarMed Lesotho - 30kW Solar PV System on health facility

RE-IPP: No private RE-IPP is currently operational in Lesotho

Overview

- Since 2008, potential IPPs have **sought government support** for renewable energy projects, but a **lack of clear frameworks** has hindered their participation.
- The Lesotho Electricity and Water Authority (LEWA) allows licensed renewable generators under 500kW to connect to the distribution network, and those over 500kW to the transmission network, for a fee.
- The 2015 "**Regulatory Framework for Renewable Energy in Lesotho**" addresses IPP licensing but hasn't been updated or officially gazetted.
- The current structure allows **IPPs to sell directly to Lesotho Energy Company (LEC)** as single buyer.
- Every **IPP negotiates their PPA with LEC directly** which needs to be approved by LEWA afterwards.
- Muela Hydro (72 MW) and the 30 MW solar PV plant of LEGCO are 2 **state-owned and the only power generating plants connected to the national grid.**
  - 100% RE power mix (not considering the imports from neighbouring countries)

TABLE 3: Estimation of market size

	MARKET SIZE
CAPEX / KW	Solar PV: EUR 500-800 Wind (onshore): EUR 1,160
Project Pipeline (until 2030)	- Hirundo 85 MW wind (EUR 98.6 Mio.) - Rexivista 100 MW solar (EUR 65 Mio.) - Astra 100 MW wind (EUR 116 Mio.)
MARKET POTENTIAL UNTIL 2030	**EUR 280 MIO.**

Foto: Muela Hydro (72 MW) plant

While the total potential for RE in Lesotho is estimated to be 8 Bn. investment volume (based on national objectives), the **expected private investments** in the next 5 years (based on the existing pipeline of private IPPs) are approx. EUR 280 Mio. for around 285 MW until 2030.

Stand-alone off-grid systems for consumptive purpose : Lesotho is a small market

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Overview

- **Solar home systems (SHS):**
  - SHS are one powerful measure to address the 300,000 **households in Lesotho that remain unelectrified**
  - **RBF** by UNDP is underdevelopment with envisaged USD75 per unit
- **Clean cook stoves:**
  - The market for clean cook stoves shows substantial potential, but due to its **immature status**, opportunities for commercial lending are limited.
- **Solar geyser (SWH)**
  - Highest demand is in the **residential sector**
  - **No incentives**, but a solar geyser of e.g. 700 EUR (150 l) is **very competitive** to the lifecycle costs of an electric hot water system (475 EUR + high operation costs)
  - According to the Lesotho Energy Policy, electric geysers shall be phased out in existing **public buildings**; SWH in NEW public buildings shall become mandatory

TABLE 4: Estimation of market size

APPLIANCE		MARKET POTENTIAL	
SHS		Annual sales (*based on past sales*)	~1,000 units
		Price per SHS (40-50 W)	~EUR 180
		SHS MARKET POTENTIAL (UNTIL 2030)	EUR 900.000
Clean cook stoves		Households to be served annually (*based on current trends*)	~16.000
		Average price per Unit	~EUR 60
		CLEAN COOK STOVE MARKET POTENTIAL (UNTIL 2030)	EUR 4.8 MIO.
SWH		Annual sales (*based on past sales*)	~670 units
		Average price per Unit (150L)	~EUR700
		SWH MARKET POTENTIAL (UNTIL 2030)	EUR 2.33 MIO.

Isolated mini-grids: RBF scheme can be a bridge towards involvement of local commercial banks

Overview

- The national objective of universal access by 2030 implicates that 60% of unelectrified households **(180,000 households) are supposed to be electrified through mini-grids**: 22.5 MW (125 W/ HH)
- Currently, 6 mini-grids are in operation, e.g. the Ha-Makebe ko kWp solar PV system
- The mini-grid regulations 2021 for mini-grids < 2MW are under review
- The **mini-grid market does not offer substantial financing potential for banks**

TABLE 5: Estimation of market size

MARKET SIZE	
Price per kWp	EUR 4,300
Number of projects until 2030	6
Average size	50 kWp
MARKET POTENTIAL UNTIL 2030	**EUR 1.3 MIO.**

Foto: Ha-Makebe Solar PV mini-grid

Renewable energy market size

FIGURE 4: Market size per segment

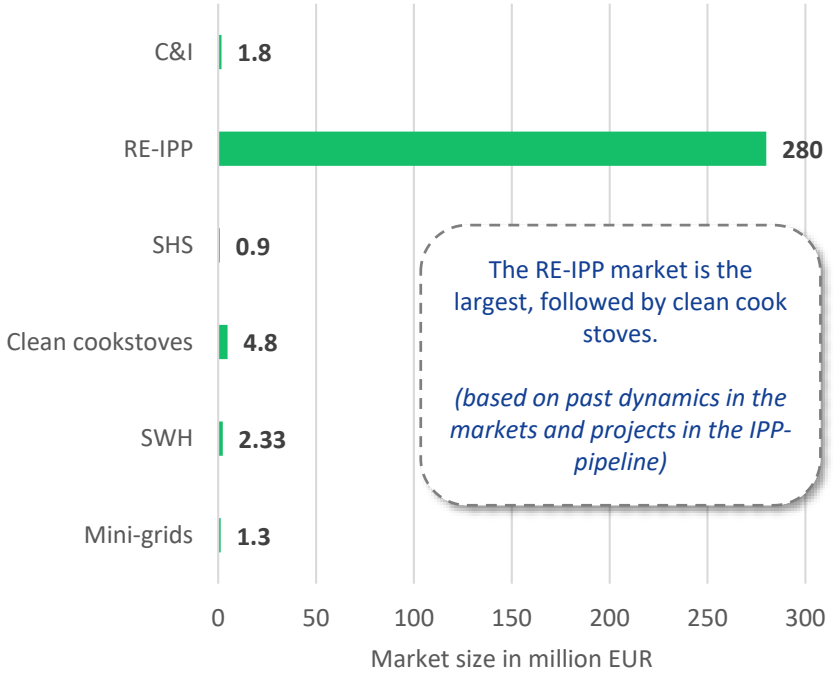

TABLE 6: Basis of the market size estimation

SEGMENT	EXPLANATION
Captive power, C&I **EUR 1.7 MIO**	• Very few projects realized until now • 25 projects until 2030 (5 projects per year)
RE-IPP **EUR 280 MIO**	• Existing pipeline of 286 MW private IPPs, including 185 MW wind and 100 MW solar PV • PPAs not yet closed • System costs: EUR 650 / kWp solar; EUR 1,160 / kW wind (onshore)
Isolated mini-grids **EUR 1.3 MIO**	• Doubling of installed capacity in next 5 years • 6 mini-grids à 50 kWp
SHS **EUR 0.9 MIO**	• Annual sales 1,000 at EUR 180 (range EUR 120-240) per unit
Clean cooking **EUR 4.8 MIO**	• 80,000 households will get a clean cook stove in next 5 years (sales of 16.000 p.a. in past years) • Prices for clean cook stoves in Lesotho: EUR 20 – 100
SWH/ solar geyser **EUR 2.33 MIO**	• Annual sales of 667 units , i.e. 3333 units in next 5 years • Prices for SWH (150 Liter): EUR 700

Renewable energy market maturity

FIGURE 5: Investment volume and market maturity

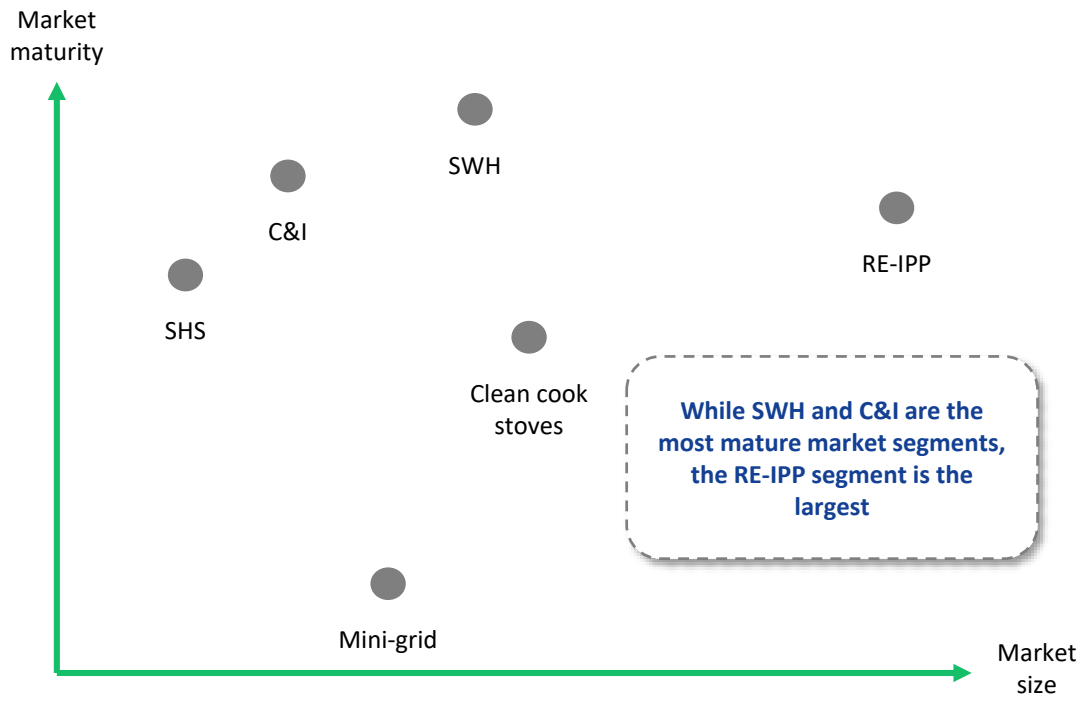

TABLE 7: Market maturity evaluation basis

SEGMENT	REMARKS (BASIS OF PROJECTIONS)
Captive power, C&I	Low risk profile, profitable for many C&I, but little experience of the companies
RE-IPP	Internationally well-established market, however future in Lesotho still uncertain; no clear specific targets and no private IPPs yet in operation; only one PPA (Neo) has been signed after a long process; each PPA must be negotiated;
Isolated mini-grids	Generally, high risk profile, mini-grid Regulations 2021 under review and refinement (by Get.Transform); lack of tariff-setting and grid-arrival regulations
SHS	Very small market, few SHS companies operating in Lesotho with little annual sales; RBF expected
Clean cookstoves	Only 2 companies; relative significant annual sales; finance includes carbon finance
SWH/ solar geyser	Several companies; selling of SWH easier than SHS acc. to companies, no incentives at all, very profitable

Commercial lending potential for local banks

TABLE 8: Commercial lending potential, per segment

SEGMENT	MARKET (IN EUR MIO)	OTHER FINANCING SOURCES (IN % OF TOTAL)	COMMERCIAL LENDING POTENTIAL* (IN % OF TOTAL)	LOCAL BANK LENDING POTENTIAL (IN % OF TOTAL)	LOCAL BANK LENDING VOLUME (IN EUR MIO)
C&I	1.7	0%	70%	70%	1.19
RE-IPP	280	50% (DFIs)	50%	50%	140
SHS	0.9	50% (subsidy)	50%	25%	0.225
Clean cook stoves	4.8	50% (subsidy)	50%	25%	1.2
SWH/solar geyser	2.33	0%	70%	70%	1.63
Minigrids	1.3	70% (subsidy)	30%	0%	0

* Including international private finance

The total commercial lending potential by banks in Lesotho is estimated to be EUR 144 Mio.

- In the SHS & clean cookstoves segments, parts of the investments will still be financed by grants
- Investments in mini-grids are not bankable, unless there are RBF schemes in place

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