



ENERGY RESEARCH CENTRE

Promoting Clean Energy



Erasmus+ LETSEMA and critical questions in national and regional energy development

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29th February 2024



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Overview

- Lesotho energy needs analysis
- Human capital development
- Electrification & energy access
- Policy and regulatory challenges
 - Processes
 - Proportionality
 - Procurement
 - Fairness & Equity: tariffs, subsidies
- Lesotho Energy Forum



NUL Library Grid Connected 2.4 kWp Solar PV Plant



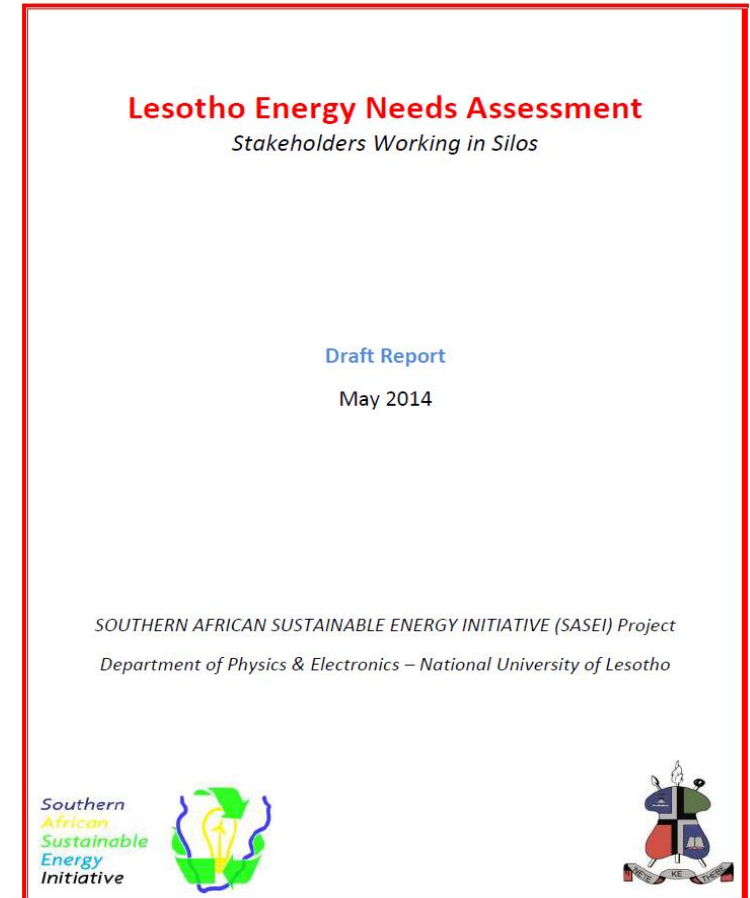
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Lesotho Energy Needs Analysis



- **EU-ACP EduLink II – SASEI Project Report (2014):**
 - “Lesotho Energy Needs Assessment: *Stakeholders Working in Silos*”
 - Pressing / persisting energy problems including ‘low energy expertise’
 - The root causes of low energy literacy:
 - Limited education and low levels of skills
 - Absence of skills transfer programmes to provide lasting impact
- **LREBRE Report (2015):**
 - Challenges for uptake of RE technologies:
 - Limited business skills or entrepreneurial skills
 - Poor workmanship in the installation of RE technologies
- **SE4ALL Report (2016):**
 - Hurdles for the preparation of bankable RE projects
 - Limited experience and capacity of government institutions
 - Lack of technical skills to install and maintain RE technologies



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Human Capital Development (1)

- **NUL Energy Research Centre established in 2017:**
 - Provide education & skills development / capacity building in sustainable energy
 - Address human and institutional capacity in the energy sector
- **Africa-EU's Renewable Energy Cooperation Programme**
 - 2017 – 2018
 - MSc Sustainable Energy development & accreditation
- **Erasmus+ LETSEMA**
 - 2023 – 2026
 - Empowers the next generation of RE professionals / technicians
 - Enhances blended problem-based learning and research
 - MSc Sustainable Energy at NUL
 - Develops micro-credentials for hands-on practical learning
 - Artisans and technicians at BBCDC
 - Complements **Renewable Lesotho**

MSc in Sustainable Energy Courses

- SE 6301 - Solar PV Systems
- SE 6302 - Solar Thermal Systems
- SE 6303 - Bioenergy
- SE 6304 - Wind Energy
- SE 6305 - Hydropower
- SE 6307 - Renewable Energy Grid Integration
- SE 6313 - Energy Economics & Project Finance
- SE 6314 - Sust. Energy Solutions for Communities
- SE 6315 - Energy Entrepreneurship
- SE 6316 - Energy Planning and Policy
- SE 7999 - Sustainable Energy Dissertation



Human Capital Development (2)

- Teaching
 - 10 – 20 students per annum
 - International students exchanges
- Research
 - RE resources assessment
 - Hybrid system design and analysis
 - RE grid integration impact assessment
 - Network planning for rural electrification
 - Determinants of household energy use / choice
 - Electricity consumption and economic growth
 - Long-term energy / electricity demand forecasting
 - Electricity capacity expansion planning



The panel recommends that with the cumulative score of **75%** for the Inputs and Processes categories, the NUL Master of Science in Sustainable Energy programme **Exceeds Minimum Standards (EMS)**. The programme should be allowed to run and will **reapply for accreditation after five academic years**. The institution is to develop and implement an Improvement Plan to be monitored by the CHE.

ff. Chief Executive:



Date: 28th January 2022



Human Capital Development (3)



- **Community Outreach**
 - **Renewable Energy Awareness Campaigns**
 - Twice a year (Nov 2023 – Maputsoe, 1 Mar 2024 – Mohale’s Hoek)
 - **Pilot Community-owned Solar PV Mini-grids**
 - Motete (52 kWp) and Linakeng (45 kWp)
- **Commissioned Studies / Advisory Services**
 - **Pioneer Developer’s Compensation / Refund Model**
 - Lesotho Electricity Company, 2020
 - **Grid Integration Studies for Wind Farms**
 - Hirundo Energy, 2021
 - **Impact of Lifeline Tariffs in Electricity and Water**
 - Lesotho Electricity & Water Authority, 2022
 - **Island and Floating Solar PV Farms Feasibility Studies**
 - Lesotho Highlands Development Authority, 2023 – 2024



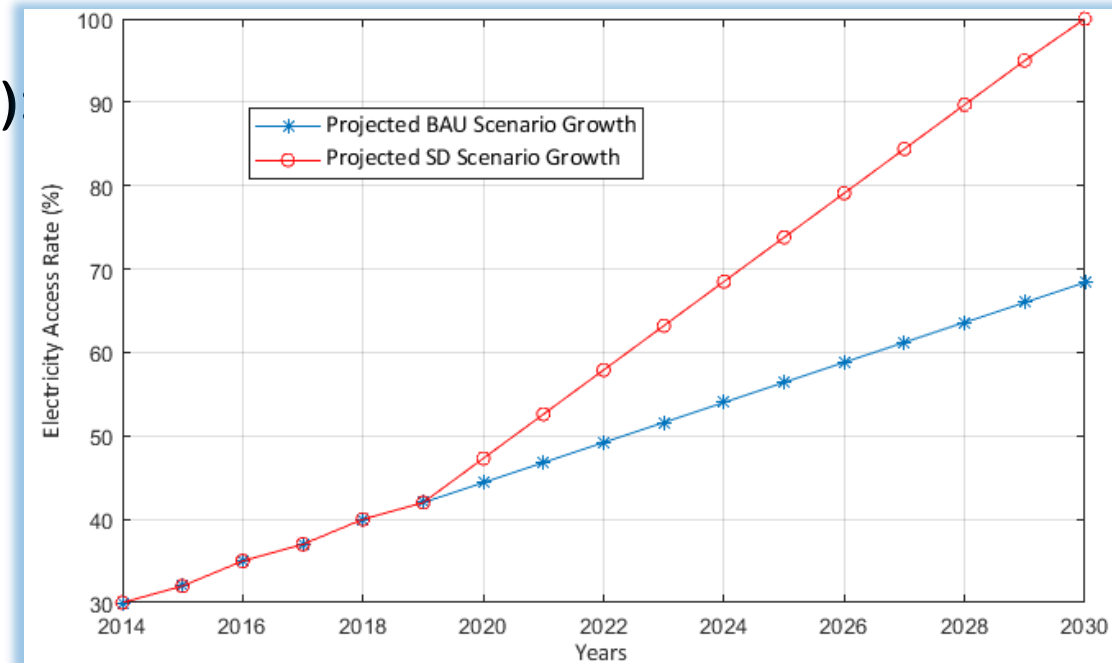
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Electrification & Energy Access



- **National Electricity:**
 - Household access – 52% in 2022
 - Peak demand – 203 MW
 - Capacity deficit (imports) – over 100 MW
- **Household Energy Consumption Survey (2017)**
 - Electricity service reaches:
 - 71% urban; 44% peri-urban; 11% rural
 - About 60% of households are in rural areas
 - Depend on biomass for cooking and space heating
- **Tracking SDG 7 (100% target by 2030)**
 - **Business-as-Usual Scenario:**
 - 68.4% will have access to electricity
 - 50% will have access to clean cooking technologies
 - **Sustainable Development Scenario:**
 - The big question is “What do we need to do to achieve accelerated universal access by 2030?”





Policy & Regulatory Challenges (1)



- **1. Processes:**
 - **Lack of one-stop shop for facilitating permits and concessions**
 - Barrier to potential developers / private sector (IPPs) participation
- **2. Proportionality:**
 - **Licensing requirements for generation are almost similar**
 - Consider category differentiation (light-handed regulation)
 - Sets appropriate requirements commensurate with size / type of IPP
- **3. Procurement:**
 - **Net-metering (< 500 kW)**
 - Incentive scheme for small customers (with own generation)
 - Get credit if fed excess energy to grid
 - **Renewable energy feed-in tariffs (REFITs) (> 500 kW)**
 - Cost-reflective, predetermined tariffs, differentiated by size and resource
 - Ensures predictability and encourages mobilization of capital
 - **Competitive auctions, tendering or bidding (> 10 MW)**
 - Could be initiated and linked to national energy plans
 - Aid transparency and facilitate project financing





Policy & Regulatory Challenges (2)



• 4. Fairness & Equity

• Electricity tariff differentiation

• Low tariff for grid customers

- Household tariffs at about M1.867 / kWh
- Including lifeline tariff for first 30 kWh

• High tariff for off-grid customers

- Mini-grids tariffs at M5.00 / kWh; Current average is 16.5 kWh per month, costing M82.50

• Grid subsidies

- 'Muela hydropower plant loan paid off by Government
- 'Muela tariff to LEC: M0.12 / kWh since 1998
- Universal Access Fund and national budget used to subsidize grid extension
- Uniform tariff for isolated (Semonkong) and cross-border (Qacha's Nek) grids
- Ramarothole Solar Farm loan to be serviced by Government

Policy Statement 10: Electricity Connections

Strategies

- b) Review and revise or formulate a connection policy
- c) **Grid extension remains the obligation the Government.** In the case where an individual is involved in extension thereof, the public utility will determine appropriate refund if the grid is to be used for other purposes.
- d) **The financial mechanism applied to grid electricity to accelerate connections will be extended to include off-grid solutions, as well, such as solar home systems and thermal applications energy efficient cookstoves and LPGas stoves)**



Policy & Regulatory Challenges (3)

• 4. Fairness & Equity (cont.)

- If mini-grid customers were on subsidized tariffs:
 - With a monthly budget of M82.50
 - First 30 kWh would be: $30 \text{ kWh} \times M0.914 = M27.42$
 - The remaining M55.08: $M55.08 \div M 1.867/\text{kWh} = 29.5 \text{ kWh}$
 - Average monthly energy: $30 \text{ kWh} + 29.5 \text{ kWh} = 59.5 \text{ kWh}$
 - The extra **43 kWh** could even give them opportunities for productive use of electricity
- A key policy objective is to protect the poor and disadvantaged groups
 - Subsidies in off-grid systems are required for grid parity
- Hanging questions:
 - When will grid tariffs be cost-reflective?
 - Why should mini-grids be market-driven while grid is not?
 - Is the market option factoring in issues of ability to pay?



Lesotho Energy Forum (1)

- **Tentative theme:**
 - “Propelling Lesotho Towards SDG 7: Universal Energy Access”
- **Collaboration with Get.transform / GIZ & Alliance for Rural Electrification**
 - Planned for October / November 2024
- **Multi-stakeholder forum for 2 or 3 days**
 - Foster cooperation and partnerships between all major stakeholders
 - Academia and NGO’s; Policymaking and Regulation
 - Independent Power Producers / Project Developers
 - Development Partners and Project Financiers

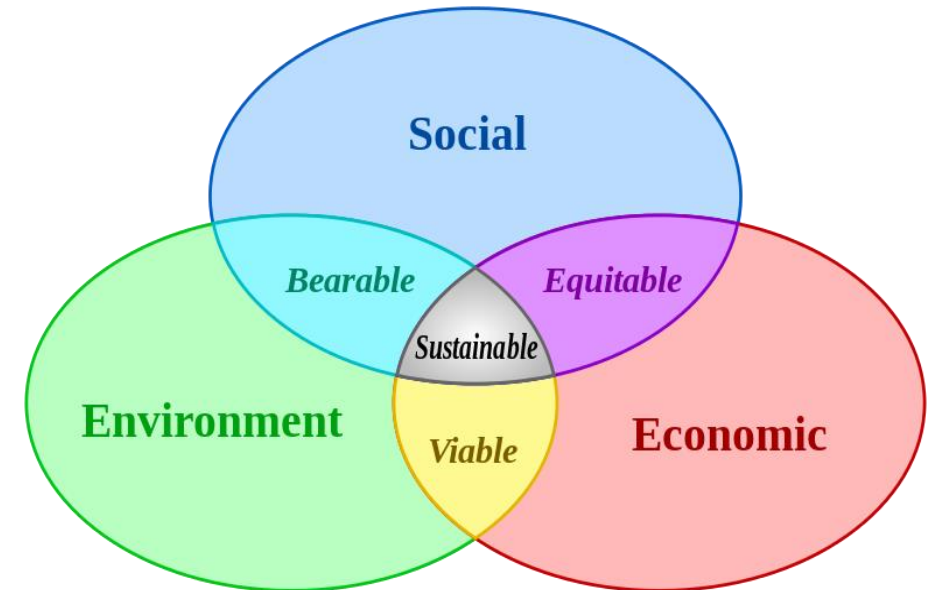
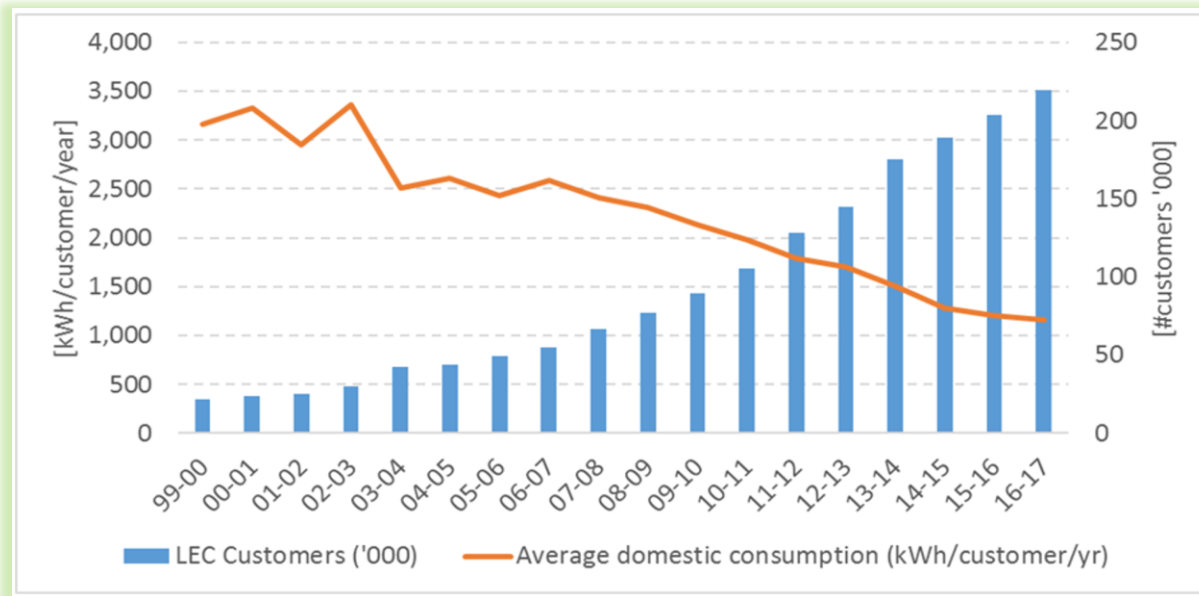




Lesotho Energy Forum (2)



- **Interrogate various persistent issues:**
 - **Matters that would enable universal access including**
 - Funding opportunities, project prospects, policy and regulations
 - **Implementable solutions with target outcomes**
 - Streamlined processes/procedures, available funding mechanisms, etc.
 - **Declining consumption with increasing grid connection**
 - Is grid extension still the best solution?



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Thank You!



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