

OFF-GRID ELECTRICITY **ACCESS EXPANSION** **PROGRAMS IN ZAMBIA**

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RURAL ELECTRIFICATION AUTHORITY (REA) - ZAMBIA

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INTRODUCTION

- ▶ Zambia is a resource-rich, lower-middle-income country located in Southern Africa which covers 752,614 square kilometers. It shares its borders with the eight (8) countries,
 - ▶ Zambia's population was estimated at 15.5 million in 2015 and is projected to reach 23.6 million by 2030.
 - ▶ Zambia's economy is dominated by copper mining and processing, agriculture and construction.
 - ▶ Zambia has a wide range of energy resources, particularly woodlands and forests, hydropower, coal and renewable sources of energy.
 - ▶ Electrification levels still remain low with only about 31.2% of the population being connected to the grid.
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LOCATION





1. ZAMBIA ENERGY SECTOR OVERVIEW

➤ ZAMBIA GENERATION CAPACITY

- Installed electricity generation capacity - 2,800 MW
- 2,380 MW (85%) - hydropower plants.
- 405 MW (15%) - Non hydro (Coal, Heavy Fuel Oil, others)
- National access to electricity averages at 31% with 67% of the urban and 4% of the rural population having access to power.



ZAMBIA ENERGY SECTOR OVERVIEW Ctd'

INDEPENDENT POWER PRODUCERS(IPP's)

- Lusenfwa Hydro Power company (LHPC), privately owned 56MW installed capacity
- Zengamina Power Company (ZPC) isolated 0.75 MW Mini Hydro Power plant
- Itezhi Tezhi Power Corporation (ITPC) 120MW jointly owned Power Station (Tata Power & ZESCO Limited)
- Maamba Collieries Limited (MCL) privately owned 300MW Coal thermal Power Plant

ZAMBIA ENERGY SECTOR OVERVIEW & INSTITUTIONAL, POLICY, LEGAL AND REGULATORY FRAMEWORK) – CONTINUED...

► ENERGY SECTOR INSTITUTIONAL FRAMEWORK

- 1. The Ministry of Energy (MOE)**
- 2. The Office for Promoting Private Power Investments (OPPPI)**-promote private sector involvement in the development of power projects in Zambia
- 3. Energy Regulation Board (ERB)**-responsible for regulating the electricity, petroleum and other forms of energy including renewable energy.
- 4. ZESCO LIMITED**- state owned national utility company
- 5. The Rural Electrification Authority (REA)**- responsible for rural electrification
- 6. Zambia Development Agency (ZDA)** - responsible for fostering the country's economic growth and development by promoting trade and investment
- 7. Industrial Development Corporation (IDC)**-an investment company owned by the Zambian Government to support Zambia's industrialization.

ZAMBIA ENERGY SECTOR OVERVIEW & INSTITUTIONAL, POLICY, LEGAL AND REGULATORY FRAMEWORK) – CONTINUED...

➤ POLICY, LEGAL AND REGULATORY FRAMEWORK

- 1. The Power Systems Development Master Plan (PSDMP, 2010)**
- 2. Rural Electrification Master Plan (REMP, 2008 - 2030)**
- 3. Renewable Energy Feed-In Tariff REFIT Strategy (2017)**
- 4. Electricity Amendment Act (2003)**
- 5. Energy Regulation Act (2003)**
- 6. Rural Electrification Act (2003)**
- 7. Zambia Electricity Grid Code (ZEGC) - SI No. 79 of 2013**
- 8. Zambia Distribution Code**

3. OFF-GRID ELECTRICITY IN ZAMBIA

➤ Off Grid Solar Power Mini Grids

1. **60kW Mpanta Solar Mini Grid** - developed by REA operated by local cooperative serving 400 Households
2. **30kW Sinda Solar Mini Grid** - developed by US Development foundation serving 60 Households in sinda district.
3. **28kW Chitandika Solar Mini Grid** - developed by a private company - Engie operated serving 378 Households in Chitandika rural community
4. **200kW Chunga Solar Mini Grid** - under development by REA targeting 150 Households for National and World Life Authority in the Kafue National Park
5. **300kW Lunga Solar Mini Grid** Under development by REA to electrify the newly created Lunga district in the Bangweulu swamps targeting 2000 Households.

➤ Off Grid Mini Hydro Plants

1. **0.64MW Kasanjiku Mini Hydro** under development by REA targeting Public Institutions and 2000 Households in Chief Ntambu and Chief Sailunga chiefdoms.
2. **0.75 MW Zengamina Mini Hydro** developed and operated by Zengamina Power Company (ZPC)

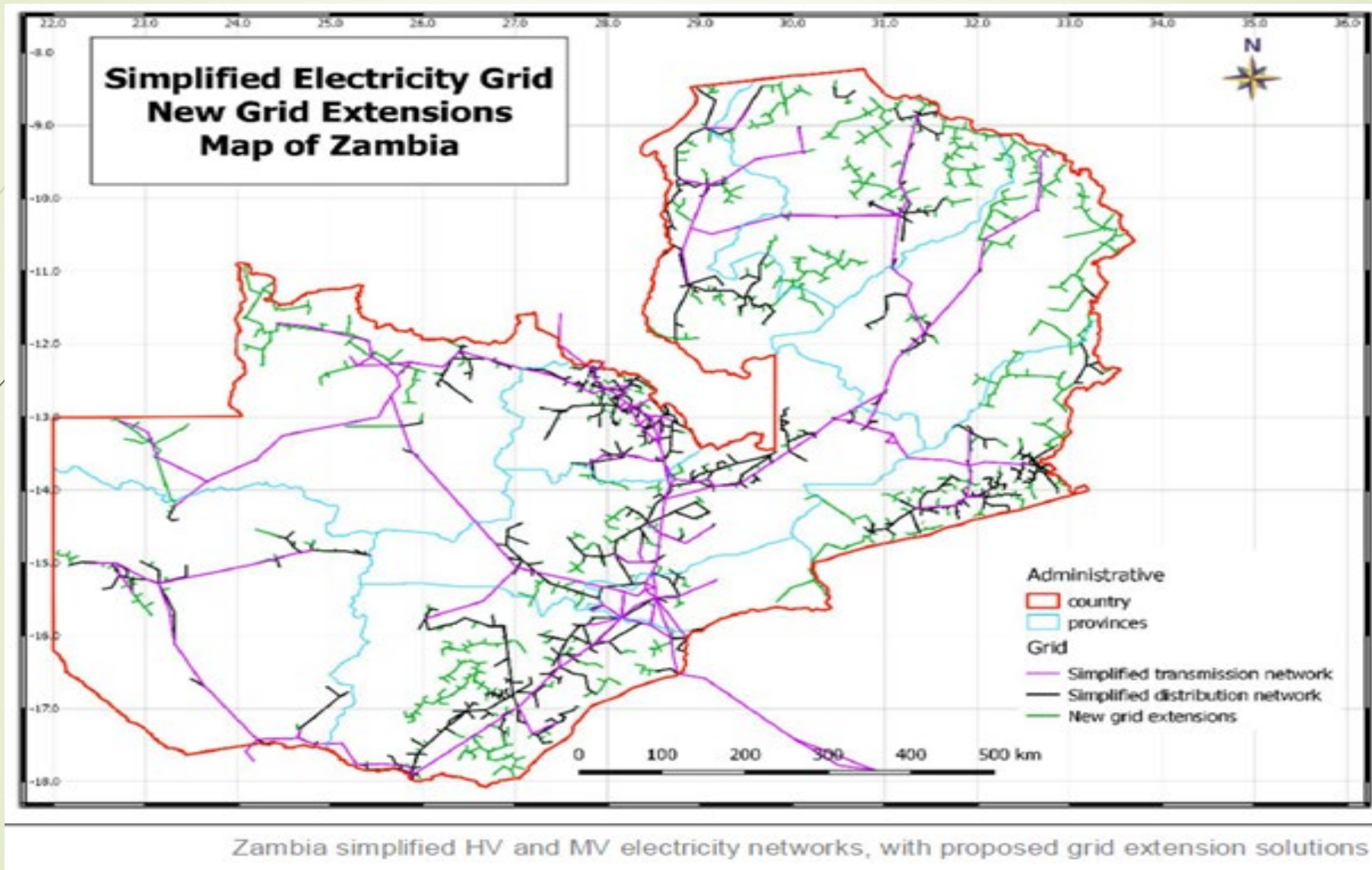
3. STRATEGIES FOR PROMOTING OFF-GRID ELECTRICITY IN ZAMBIA

The following are the on going programs promoting off grid electricity;

1. Electricity Service Access Program (ESAP)- The World Bank funded program addressing Off-grid Electricity Access Expansion in rural areas of Zambia.

The program will also cover the provision of partial Grant subsidies for the provision of energy services to consumers in selected rural areas. This component will initially fund required upstream activities to enable the private sector participation in rural off-grid electrification, including identifying and scoping off-grid sites, helping the GRZ address the existing regulatory impediments, building the needed capacity at key institutions, and designing financial mechanisms. Subject to successful completion of the upstream capacity-building activities, to be confirmed by GRZ and the World Bank, the component will then fund the piloting of two financial mechanisms: (a) a Smart Grant Subsidy Facility and (b) a Loan Facility, to support private sector-led electrification of rural communities through renewable energy mini-grids and stand-alone solar systems and structured to leverage financing and participation from the private sector.

3. STRATEGIES FOR PROMOTING OFF-GRID ELECTRICITY IN ZAMBIA




2. Increased Access to Electricity and Renewable Energy Production (IAEREP) Project – funded by the European Union (On-Going)

- The objective of the project is to increase access to clean, reliable, more equitable and affordable energy and promote renewable energy production and energy efficiency across Zambia.
- Under this project the following outcomes are expected;
 - Enhancement of Policy, Legal and Regulatory Environment and Capacity Building for Renewable Energy and Energy Efficiency and
 - Capacity Building for Renewable and Energy Efficiency – Feasibility Studies and Demonstration Projects for off-grid projects under the Rural Electrification Authority



5. CHALLENGES IN OFF GRID ELECTRICITY CONNECTION EXPANSION

1. Non-cost reflective electricity tariffs
 2. Rural settlements structures tend to be relatively scattered making it expensive for mini grids
 3. Delayed formulation of a national renewable energy strategy
 4. Challenges in the formulation of robust policy and regulatory framework for renewable energy off-grid systems
 5. Inadequate human resource capacity in RE technologies
 6. Inadequate private sector participation
 7. High investment capital costs and lack of financing mechanisms for renewable energy projects
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5. NEXT STEPS FOR OFF-GRID ELECTRICITY EXPANSION

1. Off-grid Site Characterization and Prioritization” was done to identify locations for off-grid rural electrification in Zambia, with a focus on mini-grid development.
2. Development of GIS data base for least cost electrification plan for the whole country.
3. Development of the National Electrification Strategy for Zambia which is currently under way with the support from the World Bank.
4. Encourage private sector participation through PPP approach that also allows for a competitive process amongst developers, resulting in a cost-effective solution.
5. Viability Gap assessment has been conducted and levels of subsidy proposed, Tariffs also proposed with the financial structure likely to be of 30% grant, 35% debt, 35% equity and returns resulting in 20% equity IRR). Results show a range from 1.10 USD/kWh to more than 2.00 USD/kWh.
6. Formulation of tariff calculation models for off-grid
7. Review existing regulatory frame work
8. Development of the REFIT policy being supported by the EU.

6. CONCLUSION

- ▶ Zambia is facing a formidable challenge to increase electricity access from the current rate of 31 percent nationwide, and 4.4 percent in rural areas. Doing so will require a concerted effort from all key stakeholders and development partners.

Thank for your attention

