



Scaling-Up Renewable Energy Program in Low Income Countries

Investment Plan for Zambia

Brig. Gen. Emeldah Chola

Permanent Secretary

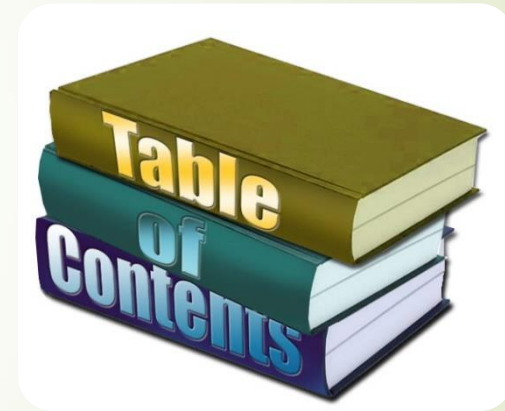
Ministry of Energy

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Outline

- Country Context
- Renewable Energy Context
- Electricity Sector Challenges
- Responsiveness to SREP Criteria
- SREP Priority Areas
- Stakeholder Consultation
- Financing Plan
- Key Take-Aways





Country Context



Location	Southern Africa	Urban Population	40%
Total surface area	752,614 Km ²	GDP/capita	US\$ 1,178.39
Population (2016)	16, 594, 051	Main Economic Sectors	<ul style="list-style-type: none"> • Copper mining • Construction • Agriculture
Population Density	21.8 people/km ²		



Overview of Electricity Sector

Generation

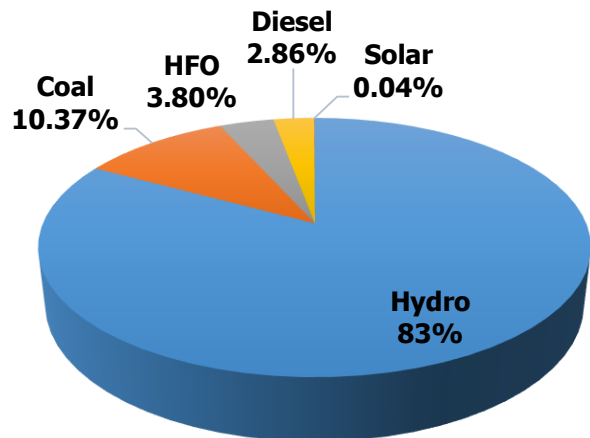
2,878 MW

Total installed capacity

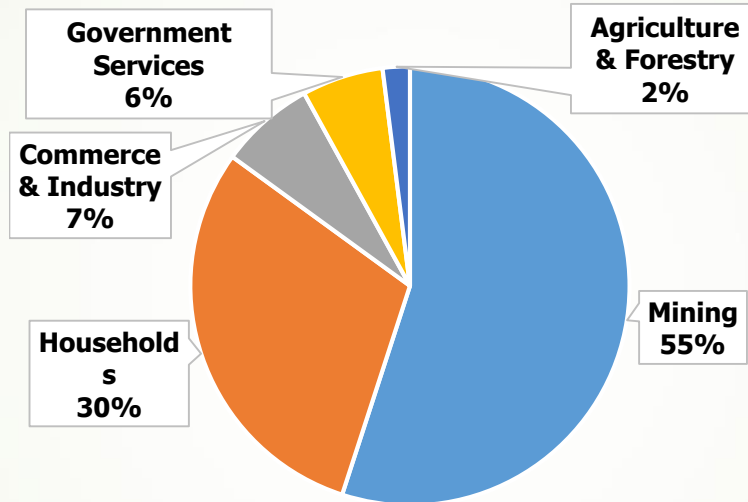
83%

of large hydro

Installed Capacity by source



Consumption



- Over 50% electricity is consumed by mining sector
- Household sector accounts for 30%

Access

31.2%

National

67.7%

Urban

4.4%

Rural

5%

Annual Demand Growth

Renewable Energy Context



Solar

- **6-8hrs/day**, energy output of **5.5kwh/m²/day**
- Solar resource measurement completed in 2017
- Targeting on-grid **200 MW – Get Fit** (supported by REFIT Strategy) and **600 MW - Scaling Solar Program**

Wind

- Average speed **7 - 8.2 m/s** at 80 meter height
- 2 year wind resource assessment completed in December 2018

Geothermal

- 80 hot springs available in Zambia
- Studies by one IPP shows **15MW to 90MW** potential In Southern Province (Lochniver Park)

Mini-hydro

- Installed capacity of **39.55 MW**
- Potential of additional **38.6 MW**
- 0.64 MW under construction by REA

Biomass

- Study done by IRENA in 2016 indicates **500 MW** potential
- Biomass and Food Security Assessment underway



Challenges for Renewable Energy Deployment



- Non-cost reflective electricity tariffs
- High upfront investment costs
- Lack of financing for renewable energy projects.
- Lack of robust policy and regulatory framework for renewable energy off-grid systems
- Affordability issues for on-grid projects /off-taker creditworthiness
- Inadequate human resource capacity in renewable energy technologies



Responsiveness to SREP Criteria



Prioritisation of RE Technologies

- ▶ **On-grid** - limited additionality was found for the on-grid market segment, given the on-going and planned initiatives from GRZ & Cooperation Partners focusing on solar & mini-hydros
- ▶ GRZ has prioritized support to wind & geothermal
- ▶ **Off-Grid** – The IP has adopted a technology neutral approach for off-grid and mini-grid segments given the sparsely populated rural areas

Anticipated Outcomes

This Investment Plan will:

- Provide **additional 100 MW from RE**
- Increase access to energy to about **50,000 households**
- Ensure **affordability and competitiveness** through smart subsidies/grants
- Ensure adherence to **environmental regulations**
- Replace diesel plants with RE/hybrid mini-grids to **reduce GHG emissions**, associated health risks
- Reduce deforestation caused by use of wood fuel for cooking
- Promote **gender equality** through the National Gender Policy & 7NDP guidelines



SREP Investment Plan Components



Three main priority areas

- **Component 1: Energy Access in Rural and Peri-Urban Areas**
- **Component 2: Wind Power Promotion**
- **Component 3: Investment in Geothermal Resources**



Energy Access in Rural and Peri-Urban Areas



To increase **access to modern energy services** for rural and peri-urban households

RE off-grid/mini-grids including **solar home systems** and **clean cooking solutions** (such as biogas & improved cooked stoves)

- **75 MW** from off-grid systems
- **50,000 households** connections
- Boost **productive uses of electricity**
- Improve **health outcomes**

- Only 4.4% rural electricity access
- Need to intensify off-grid electrification and clean cooking

Wind Power Development



Diversify energy mix and promote **private investment in wind**

- **Policy and regulatory framework** for wind energy
- Full project documentation package for **wind auction**

- At least **15MW of wind power**
- Improved quality and reliability of electricity provision for **4.5 million on-grid customers**

- Availability of 2 year wind resource measurement
- Strong private sector interest



Investment in Geothermal Resources



Promote use of **geothermal resource** for **electricity generation** and **agro-industrial activities**

- **Enabling framework** for electricity production
- **Comprehensive master plan** for promotion of direct uses of geothermal energy
- **Risk mitigation facility** for private sector investment

- **At least 15 MW** of utility scale-geothermal power
- Stable and reliable **baseload power** / diversification from (climate sensitive) large hydro
- **Direct uses of geothermal energy** for tourism, agriculture, etc.

- Unlock the geothermal market
- Leverage additional financing from public and private sources



Stakeholder Consultation



Consultations were made with relevant government ministries/agencies, private sector players, NGOs, academia and cooperating partners.

Key comments:

- Need to broaden scope from “electricity access” to “energy access” to include other **modern energy uses** (e.g. clean cooking)
- Need for **low cost financing** and grants to scale up off-grid development
- Need for **regulatory framework** for deployment of renewables
- Pay special attention to **affordability** and **inclusiveness** – “**leave no one behind**”
- **Coordinate** among Cooperating Partners and **leverage synergies** with on-going initiatives



Financing Plan



	Total	SREP	WB	Other donors	Private sector	GRZ
Component 1 – Energy Access in Rural and Peri-Urban Areas						
Investment in off-grid and mini-grid electrification solutions	161.7	10	45.9	55	50	0.8
Sub-total	161.7	10	45.9	55	50	0.8
SREP leverage	1:15					
Component 2 – Wind Power Promotion						
Development of regulatory framework	0.65	0.6	-	-	-	0.05
Preparation of auction for a wind power plant	1.5	1.5	-	-	-	-
Subtotal	2.15	2.1	-	-	-	0.05
SREP leverage	1:8					
Component 3 - Investment in Geothermal Development						
Policy support and community development master plan	0.6	0.6	-	-	-	-
Investments – Risk mitigation facility	50.5	5	-	-	45	0.5
Subtotal	51.1	5.6	-	-	45	0.5
SREP leverage	1:8					
Total	214.95	17.7	45.9	55	95	1.35
Total SREP Leverage	1:11					



Key Take-Aways



- Endorsement of the IP will contribute to the attainment of the national electrification goals
- The Project Preparation Grant will help prepare quality investment proposal
- GRZ will continue to engage other MDBs & financing providers (including GCF) for additional support
- GRZ is committed to maximize the transformational impact on the economy



Thank You For Your Attention