ZAMBIA REFIT POLICY
2015

GENERAL OVERVIEW

IES / SEE / Ea Pty Ltd
17 March 2014 Lusaka
Work undertaken so far includes:

• Three Background Reports
• Interviews, meetings, data collection
• Workshops
Starting points

- Policy, not....
- Experiences from elsewhere....
- Low-cost, no cost.....
Starting point: Low cost – no cost

<table>
<thead>
<tr>
<th>RE type</th>
<th>Tariff</th>
<th>REFIT</th>
<th>1 MW plant</th>
<th>Zesco procure</th>
<th>Zesco</th>
<th>Zesco sales</th>
<th>Zesco profit</th>
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<td>100</td>
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<td>70,000,000</td>
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<td>70,000,000</td>
<td>-</td>
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<td>0.07</td>
<td>700,000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>160</strong></td>
<td><strong>33,000,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
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Sample - Kenya tariffs

<table>
<thead>
<tr>
<th>RE type</th>
<th>Tariff</th>
<th>REFIT</th>
<th>1 MW plant</th>
<th>Zesco procure</th>
<th>Zesco</th>
<th>Zesco sales</th>
<th>Zesco profit</th>
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<td>100</td>
<td>10,000,000</td>
<td>100,000,000</td>
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<td>70,000,000</td>
<td>(30,000,000)</td>
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<tr>
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<td>0.07</td>
<td>3,150,000</td>
<td>(450,000)</td>
</tr>
<tr>
<td>Biomass</td>
<td>0.08</td>
<td>20</td>
<td>9,000,000</td>
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<td>0.07</td>
<td>12,600,000</td>
<td>(1,800,000)</td>
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<tr>
<td>PV solar</td>
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<td>25</td>
<td>4,000,000</td>
<td>20,000,000</td>
<td>0.07</td>
<td>7,000,000</td>
<td>(13,000,000)</td>
</tr>
<tr>
<td>Micro gen</td>
<td>0.07</td>
<td>10</td>
<td>1,000,000</td>
<td>700,000</td>
<td>0.07</td>
<td>700,000</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>160</strong></td>
<td><strong>33,000,000</strong></td>
<td><strong>138,700,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>(45,250,000)</strong></td>
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Sample - Uganda tariffs

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<th>RE type</th>
<th>Tariff</th>
<th>REFIT</th>
<th>1 MW plant</th>
<th>Zesco procure</th>
<th>Zesco</th>
<th>Zesco sales</th>
<th>Zesco profit</th>
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<td>9,000,000</td>
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<td>12,600,000</td>
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<td>(29,200,000)</td>
</tr>
<tr>
<td>Micro gen</td>
<td>0.070</td>
<td>10</td>
<td>1,000,000</td>
<td>700,000</td>
<td>0.07</td>
<td>700,000</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>160</strong></td>
<td><strong>33,000,000</strong></td>
<td><strong>133,615,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>93,450,000</strong></td>
<td><strong>(34,225,000)</strong></td>
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</table>

USD - United States Dollars
Policy content

Five Chapters:

• 1: Context
• 2: Barriers, rationale & priorities
• 3: Vision and principles
• 4: Objectives
• 5: Institutional and implementation
Chapter 1: Context

• Zambia’s energy ambition to increase generation and involve the private sector in new facilities (National Long Term Vision 2030)

• Increasing energy demand at ca. 6 % per year (150-200 MW) resulting from demographic, socio-economic and resource factors

• With 25% electrification level, Zambia faces challenge to provide universal access to energy

• Electricity is predominantly consumed by the mining industry, 68%, while households only use 19% of total
Chapter 1: Context

- Hydro-electricity represents 99% of electricity production. Hydropower resource potential 6,000MW, installed 1/3

- Hydropower likely continue to be the main energy generation source due to resource availability and low cost of generation

- However, expansion and diversification of the existing available renewable energy resources is required: Short-term diminishing electricity reserve margin; Medium to long-term issues with energy supply security

- Rich in other renewable energy resources (geothermal, biomass and solar), which short- to medium term, with mini-hydro, can be added to the energy generation mix to cover 5-10% of generation capacity
Chapter 2: Barriers

- Lack of a dedicated policy framework and policy measures providing an effective Governmental framework for uptake of private sector investments in the energy sector
- Lack of clear guidelines, rules and regulations for operationalisation of private sector involvement. This includes guides for long-term contracts, payment guarantees, tariff calculations, grid connection procedures and costs, governmental priorities, tender procedures, etc.
- Lack of clear and standardised government-backed Power Purchase Agreement (PPA) to support private sector financing of grid-connected projects
- Relatively low tariff levels contributed to low uptake of private sector investments
Chapter 2: Rationale

• Need for additional power generation

• Need to accelerate decision-making process to approve new projects, encourage more actors in the sector as well as improve capacities to package and design bankable projects

• Need for a dedicated policy framework that focuses on the specific of expansion and diversification of renewable energy uptake through private sector involvement and use of Feed-in-Tariffs with a clear institutional & financial framework
Chapter 2: Rationale

- Need for a platform and remove barriers for increased private sector involvements in the expansion of the energy sector
- Need short-term to increase generation output through private sector generation investments in technologies that are able to participate at relative low tariff levels and thereby alleviate the governments new generation investment program
- Need medium-long-term to contribute to a diversified renewable energy mix in order to create increased energy security
- Need to intelligent distribute risks, rights and responsibilities among stakeholders
Chapter 2: Priorities

• At the core, REFIT is based and depends on private sector financing and must attract investors. This means that the tariff must be able to cover the generation cost of a given technology, including sufficient rate of return and provision for technology and country risks.

• The Government, however, needs to balance the need to keep energy prices low due to existing poverty levels and competing social needs.
Chapter 2: Priorities

• **Controlled costs.** To avoid increasing power prices, the REFiT shall apply REFiT program, tariff and project caps to limit the Government’s guarantee requirements, to limit the potential additional costs to the customers, and to limit the share of technologies with comparatively high specific cost and high variability. A non-differentiated tariff at avoided costs of marginal energy supply for medium sized hydro generation (40-80 MW) shall initially be utilised to control and manage the REFiT program costs.

• **Alignment with a National Integrated Resource Plan (IRP).** The REFiT aims to increase national power supply owned by private sector investors. However, it is imperative that this additional power supply shall be in line with a national Integrated Resource Plan (IRP). *Integrated resource planning* shall be introduced as an important tool for the identification and optimisation of the appropriate mix of energy resources to meet short-, medium- and long-term electricity needs in a sustainable way.
Alignment with the National Utility. The REFIT aims to increase national power supply owned and operated by private sector investors. However, it is imperative that this additional power supply shall be in line with the existing grid infrastructure and the requirements of grid stabilisation as outlined in the Zambia Grid Code. The Grid Code provides guidance on the access, on agreed standard terms, to all parties wishing to connect to or use the transmission system and operation of the grid (timing, cost of grid connection and grid enhancements etc.)

- Adopting scale-differentiated approaches with net-metering / micro-generation for the household, community and small-scale entrepreneurial level; REFIT for small- to medium-sized private sector power producers and separate processes for large-scale projects

- A gradual and programmatic approach for expanded inclusion of private sector projects. This includes initial focus on development of necessary measures linked with a gradual introduction of private sector projects controlled through total generation size, tariff and project size caps
Chapter 2: Priorities

• **Efficient, low-cost and streamlined administrative** for the private sector participant to become efficient independent power producers: Effective processes for licensing, EIA approvals, grid integration, land issues, etc. Efficient processes are in particular important for smaller developers hurt by lengthy and complicated administrative processes.

• **Focus on agricultural development.** REFiT shall, where appropriate and possible, tap into priorities of the key job creation and economic sector of agriculture.

• **Focus on rural electrification.** REFiT shall include preferences for rural power generation and distribution solutions.
Chapter 2: Priorities

• Focus on local entrepreneurship, local ownership and inclusive equity participation

• Focus on gender to promote gender balance in energy ownership and management

• Focus on FDI investments

• Focus on continuous adjustments
• The first 3-year phase of the REFiT program shall be governed by the generation and tariff measures laid out in the Objectives and Measures of the Policy and by fast-track development of the Mechanisms laid out in the Implementation Framework of the Policy. Subsequent REFiT program phases shall be determined at the end of the first phase by revised and updated mechanisms.

• The first phase is guided by opportunities of inclusion of no- or low-cost private sector suppliers in the energy mix with an initial use of a non-differentiated tariff based on the avoided costs of marginal energy supply at relevant voltage levels of medium-sized hydropower generation to manage electricity prices, and inclusion of smaller, local producers low voltage projects, which can be connected through the present tariff levels with no additional costs to the National Utility.

• The first phase is capped by a total generation cap and a project size cap to accommodate the capacity of the existing grid and secure that max. 10% new generation shall be added to the existing distribution network in the first phase. The first phase is furthermore divided into caps for hydro-, non-hydro- and micro-generation to contribute to energy source diversification.
The REFiT Policy is aligned and links to the NEP 2008 and the NEP 2008 vision: To harness the renewable energy sector’s potential to drive economic growth and reduce poverty

Guiding Principles

• To provide a dedicated Policy framework for expanded renewable energy uptake through private sector participation

• To introduce an appropriate and sustainable renewable energy feed-in-tariff system to attract private sector participation and investment
Chapter 4: Objectives (1)

To provide for a 3-year REFiT generation allocation of initially 150 MW, divided into 100 MW hydropower and 50 MW non-hydropower

• Preparation and issuing of a rapid IRP allocation based on existing available data in relation to the first phase 150 MW REFiT allocation taking into consideration location, distribution network, existing and planned projects, etc. Each project shall have a maximum size of 20 MW. The allocation shall be divided into 100 MW for hydropower projects and 50 MW for non-hydropower projects (photovoltaic and thermal solar, geothermal, biomass and wind). No differentiation of non-hydro projects shall be made for the first phase

• Preparation and issuing of a REFiT tariff for the REFiT allocation. The tariff shall be a non-differentiated tariff for the initial allocation at avoided costs of marginal energy supply by a medium sized (40-80 MW) hydropower plant by ZESCO, at relevant voltage levels, at a national average location and linked to incremental tariff increases

• Securing that existing grid connection and grid utilisation rules, including rights, responsibilities and pricing mechanisms, accommodate eligible generation plants under the REFiT and provide effective and timely grid access

• Defined as per NEP2008, but with micro-hydro placed under the hydropower generation allocation
Chapter 4: Objectives (1)

- Preparation and issuing of technology-specific standardised licenses and PPAs for the REFiT scheme with ZESCO as the off-taker
- Preparation and issuing of PPA payment guarantee by Ministry of Finance or similar reputable national or international institution
- Preparation and issuing of Governmental preferences for private sector participation, including preference for improved electricity access to social services such as schools and health centers; local community equity allocation and profit sharing; expanded rural electrification; and agricultural development such as electricity to farm blocks, irrigation and agro-processing
- Implementation of the REFiT scheme for private sector participation. This includes preparation of competition criteria and Governmental preferences, and the management of the tendering process (program announcement, Terms of Reference, Expression of Interest, pre-qualification and issuance of licenses and PPA for prioritised projects)
To provide for a 3-year REFiT micro-generation allocation of initially 10 MW

- The Policy measures below shall create additional 10 MW grid capacity by providing the platform for financing and construction of 10 MW private sector micro-generation within the 3-year period of the first phase. The system shall be based on net metering in such a way that the micro-generation serves the owners own consumption first, exports surplus production to the grid, which is then deducted from the overall consumption bill, but no positive earnings are allowed in the first phase of the REFiT program.

- The benefit for the micro-generation owner is that all produced energy can be utilized with no energy lost due to discrepancies between actual time of production and consumption given that total production is below total consumption. The micro-generation allocation shall introduce an incentive scheme to promote the generation of small-scale renewable energy with variation between different technologies and sizes in order to gain broad learning and demonstration in preparation for longer-term goals.
Chapter 4: Objectives (2)

- Preparation and issuing of a rapid IRP allocation in relation to the first phase 10 MW low voltage micro-generation REFIT allocation taking into consideration location, distribution network, etc. The allocation shall make it possible for each micro-generation project to connect renewable energy power of maximum 300 kW size to the low-voltage electricity grid.

- Preparation and issuing of grid connection rules to adopt an open-access micro-generation connection regime. All direct connection costs shall be borne by the owner of the micro-generation power plant, while ZESCO shall cover additional inputs and costs for net-metering readings, billing, etc.

- Preparation and issuing of a tariff for the micro-generation allocation. To make the micro-generation incentive administratively simple and effective, the micro-generation scheme for the first phase is based on energy savings corresponding to prevailing tariff levels.
To provide a platform for the second REFiT phase

• Preparation and issuing of a comprehensive IRP before end of the 3-year period in relation to future generation allocations taking into consideration resource mapping, developments in generation technologies, location, distribution network, etc. Further allocations shall be linked to the issuance of the comprehensive IRP

• Based on the results of the M&E process, adjustment and issuing of revised tariff(s), grid connection and utilization rules, standardized licenses and PPAs, PPA payment guarantees, Government preferential procurement guidelines, and tender management processes
Chapter 5: Institutional

Overall responsibility

• The Ministry of Mines, Energy and Water Development (MMEWD) is overall responsible with the explicit responsibility for REFiT Policy formulation, implementation, promotion, monitoring and evaluation.

Key implementation stakeholders

• The Ministry Of Mines, Energy and Water Development (MMEWD) as the national Ministry responsible for energy policy formulation and implementation

• The Energy Regulation Board (ERB) as the national independent energy sector regulator responsible for ensuring reasonable return on investment for operators/utilities, ensuring quality services at affordable prices for the consumer, licensing of operators/utilities, setting tariffs and monitoring market competition

• ZESCO Limited as the state-owned public utility involved in generation, transmission, distribution and supply of electricity to the end-user
Chapter 5: Implementation

The Ministry of Mines, Energy and Water Development (MMEWD):

- **Rapid IRP allocations.** Rapid Integrated Resource Plan (IRP) allocations shall be prepared in close cooperation with ERB and ZESCO and issued by MMEWD as the basis for the first 3-year phase of the REFiT hydro, non-hydro and micro-generation allocations.

- **PPA payment guarantee.** A PPA payment guarantee for the hydro and non-hydro REFiT allocation shall be issued by the Ministry of Finance or similar reputable national or international institution.

- **Governmental preferential guidelines.** Preferential private sector involvement guidelines in line with the specific Policy priorities listed in chapter 2 shall be prepared in close cooperation with all key stakeholders and issued for the hydro and non-hydro allocations before the tender process is initiated.

- **Tender rules and processes.** REFiT tender rules and processes for private sector power generation shall be issued by MMEWD in close cooperation with ZPPA for the hydro and non-hydro allocations before the tender process is initiated. MMWED shall administer the tender process.
Chapter 5: Implementation

The Energy Regulation Board (ERB):

• **Marginal avoided costs.** The marginal avoided costs shall be calculated and issued based on the avoided costs of marginal energy supply at relevant voltage levels, medium sized (40-80 MW) hydro generation by ZESCO, at a national average location and linked to incremental tariff increased announced by ERB. The marginal avoided cost shall be developed and proposed by ZESCO for approval by ERB.

• **REFiT tariff.** A REFiT tariff shall be issued by ERB for the REFiT hydro and non-hydropower generation allocations based on the calculated avoided costs of marginal energy supply. The tariff shall be linked to incremental tariff increases announced by ERB.

• **Grid rules alignment.** ERB shall ensure that existing Grid Rules is aligned to and accommodate the REFiT Policy for the hydro, non-hydro and micro-generation allocations.

• **Standardised PPA and licenses.** Technology-based standardised PPAs and licenses shall be prepared and issued by ERB with ZESCO as the off-taker for the hydro, non-hydro and micro-generation allocations. The PPA and license templates shall be developed and proposed by ZESCO for approval by ERB.

• **Micro-generation connection guidelines.** The micro-generation connection guidelines shall be developed and proposed by ZESCO for approval by ERB.
ZESCO:

- Active participation and execution. ZESCO shall provide active participation in development and formulation of secondary mechanisms outlined above and effective and timely execution of roles and responsibilities as laid out in the secondary mechanisms issued by MMEWD and ERB.
Quarterly Objective indicator reporting

- Registration and quarterly disseminate information on Policy implementation of capacity / size installed during the first 3-years under the objective: REFiT generation allocation of initially 150 MW, divided into 100 MW hydropower and 50 MW non-hydropower

- Registration and quarterly disseminate information on Policy implementation of capacity / size installed during the first 3-years under the objective: REFiT micro-generation allocation of initially 10 MW
Chapter 5: M&E & A

Semi-annual M&E national priorities and measures reporting

• **Status and assessment of price and cost impact** on increases of power prices and the effectiveness of the program, tariff and technology caps applied to limit the Government’s guarantee requirements, to limit the potential additional costs to the customers

• **Status and assessment of impact of initial use of non-differentiated tariffs initially based on the avoided costs of marginal energy supply** at relevant voltage levels of medium sized hydro generations, including assessment of the tariff level to avoid rise in electricity prices and still attract private investors

• **Status and assessment of alignment with national IRP** in relation to scale and location of additional private sector power supply

• **Status and assessment of alignment with the National Utility** in relation to existing grid infrastructure and grid stabilisation and to the specific conditions of grid access (timing, cost of grid connection and grid enhancements etc.) negotiated between the National Utility and the private sector power supplier

• **Status and assessment of scale-differentiated approach** with micro-generation for the household, community and small-scale entrepreneurial level (low voltage); REFiT for small-to medium-sized private sector power producers and separate processes for large-scale projects
Chapter 5: M&E & A

- **Status and assessment of the application of efficient, low-cost and streamlined administrative processes**, including the status of completion of secondary mechanisms, assessment of timeliness, delays and need for further adjustments. The status shall include assessment of procedures for licensing, EIA approvals, grid integration, technology-based standardised PPA, land requirements, water rights (where applicable) etc. The assessment shall have particular focus on impact of procedures for smaller developers and community projects.

- **Status and assessment of impact of PPA payment guarantee** on ability to secure longer-term loans at affordable interest rates, including assessment of number, content and effectiveness of PPAs.

- **Status and assessment of actual FDI investments**, including actual additional international investments due to REFiT.

- **Status and assessment of impact on agricultural sector** in relation to economic development, employment, investments and participation of sector key stakeholders.

- **Status and assessment of impact on rural electrification**, including assessment of impact on rural power generation and distribution.

- **Status and assessment of impact on local entrepreneurship, local ownership, inclusive equity participation and involvement and gender** in relation to the design, implementation and ownership of REFiT power projects.

- **Overall conclusion regarding need for adjustments** in relation to costs, tariff levels, administrative procedures, and secondary mechanisms.
Thank you