

Power Sector in Zambia – Opportunities for Private Companies

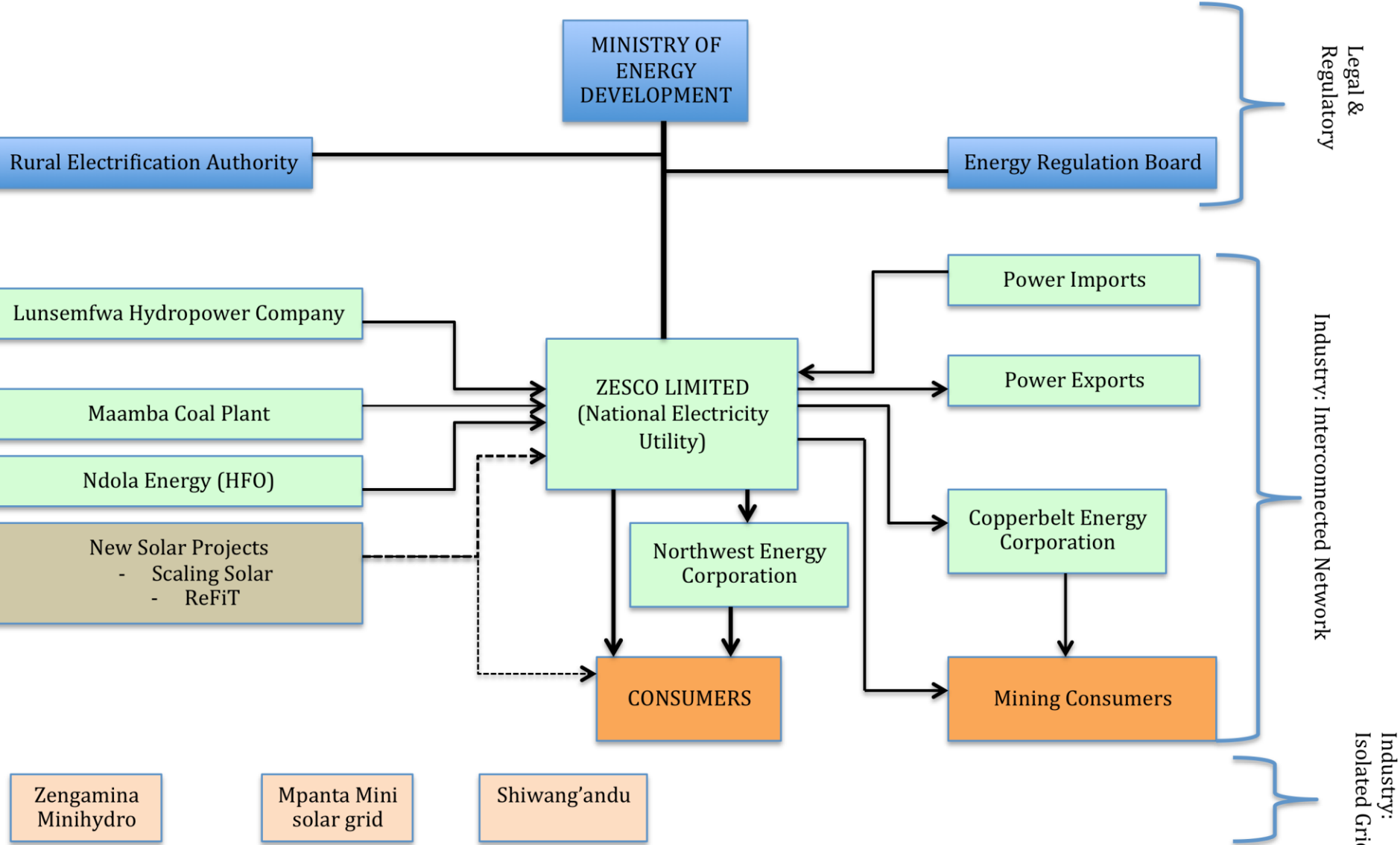
Presentation of the Information Workshop
on Decentralised Energy Supply and Load
Management in Zambia

Berlin, Germany, December 2017

Outline

- Structure of Zambia's electricity sub sector
- Legal and Regulatory regime
- Generation mix
- Investment opportunities for private German Companies in the sector
- Wind Sun Energy Zambia Limited
 - Company Profile
 - Project outlook
 - Networking opportunities

Structure of the Electricity Sub-sector



Source: Adapted from Kapika and Eberhard, 2013

Legal and Regulatory Framework

- Ministry of Energy:
 - Implements government policy framework and guidance
- Zambia Development Agency:
 - One stop shop for all Investors under Ministry of Commerce, Trade and Industry
 - Drives economic growth and development
 - Promotes Trade and Investment
- Zambia Bureau of Standards
 - Development and enforcement of Standards
 - Provides facilities for examination and testing for compliance

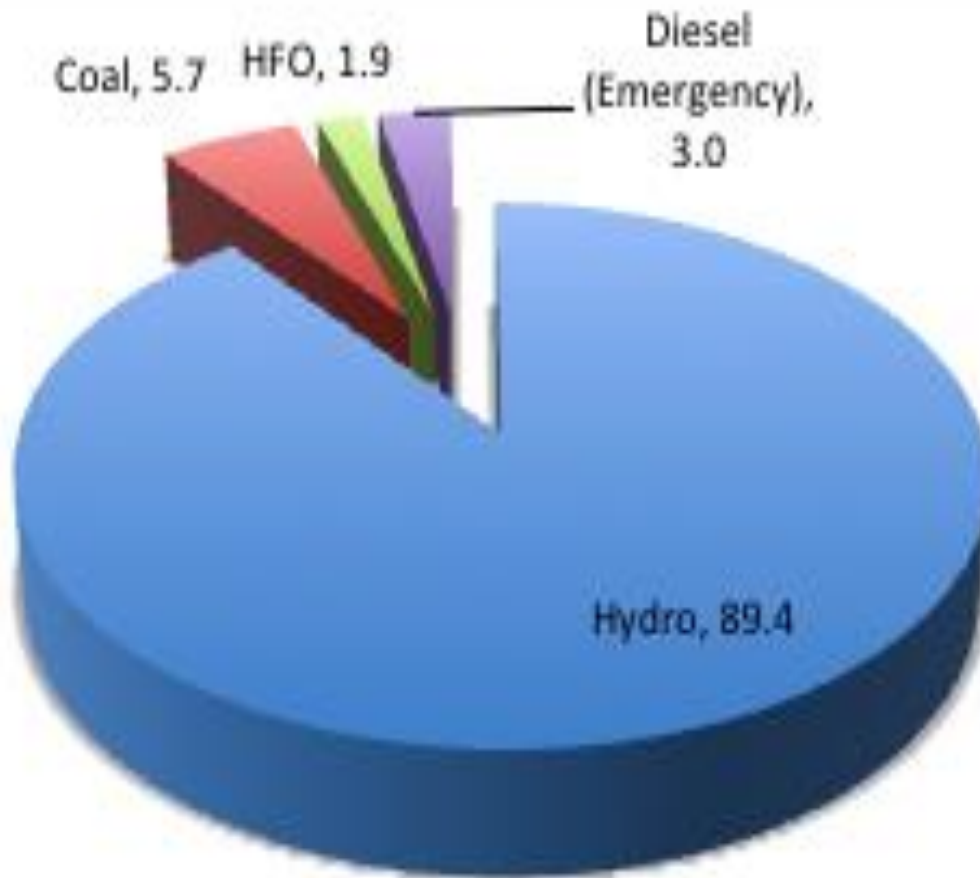
Legal and Regulatory Framework

- Office for Promoting Private Power Investment (OPPI):
 - Unit under MoE responsible for attracting investment in power generation facilities above 20MW
 - Coordinates expansion of the interconnected power system
- Industrial Development Corporation
 - Government-owned investment company
 - Taken up development of generating facilities between 10MW and 20MW
- Energy Regulation Board:
 - Independent energy regulator
 - Provides regulation framework and harmony among the sector players for the benefit of consumers
 - Responsible for issuance and administration of licenses
 - Interim manager of the Grid Codes
- Rural Electrification Authority:
 - Government institution responsible for implementing rural electrification
 - Management of the Master Plan
 - Management of the Rural Electrification Fund
 - Develops mechanisms for operation of grid extension network
 - Administration of capital subsidies
 - Development of generating plant of capacities up to 10MW

Installed Capacity

COMPANY	POWER PLANT	GENERATION CAPACITY (MW)
Zesco	Hydro	2217
Zesco/ Tata	Hydro	120
Maamba	Coal	300
Lunsemfwa Hydro	Hydro	34
Ndola Energy	HFO	50
CEC	Diesel	80
TOTAL		2,801

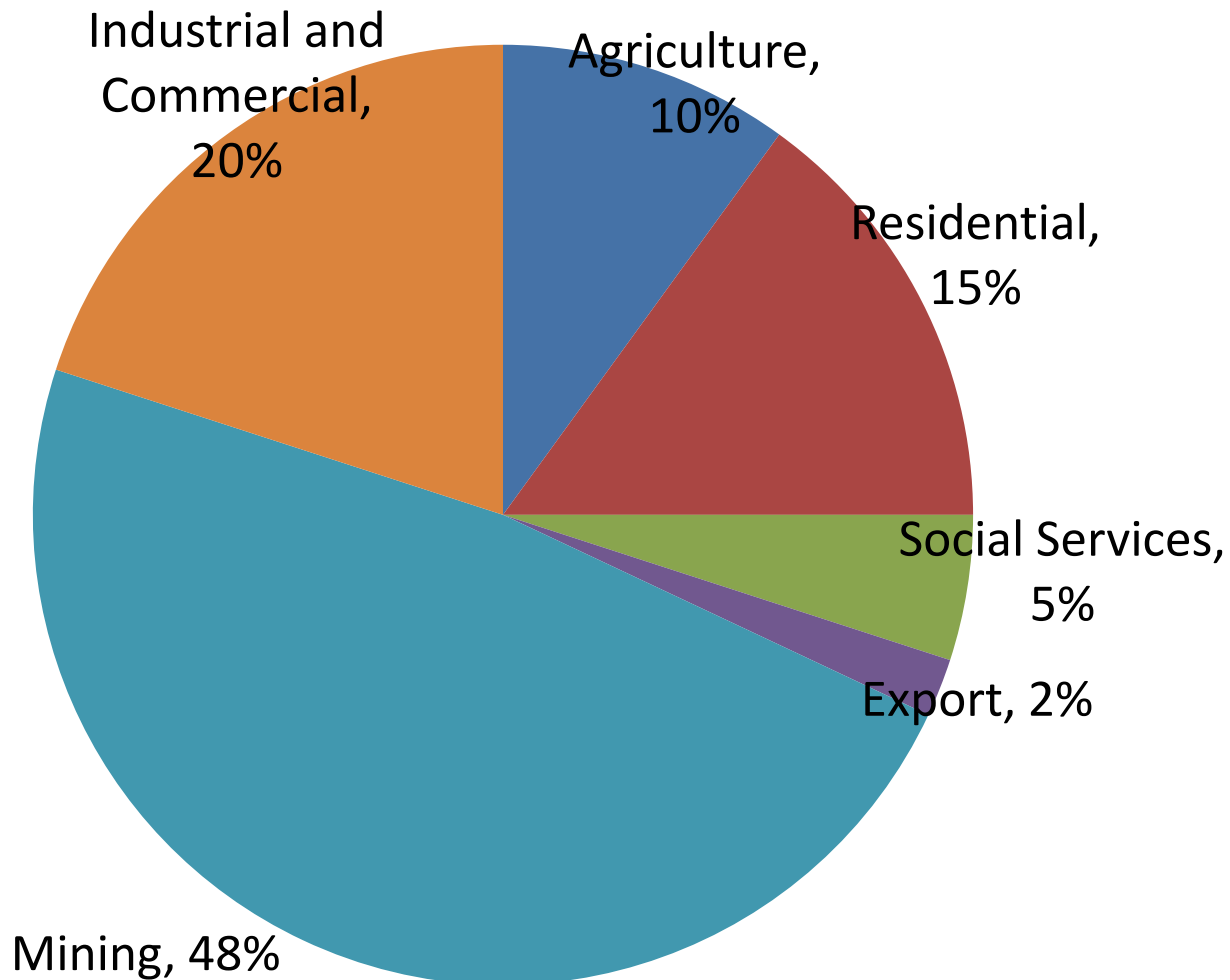
Zambia's Power Generation Mix



Transmission/ Distribution Capacity

		VOLTAGE LEVEL	LENGTH (km)
Zesco	Transmission	330kV	2241
		220kV	571
		132kV	202
		88kV	794
		66kV	3217
	Distribution	33kV	2100
		11kV	1037
CEC	Transmission	220kV	246
		66kV	678

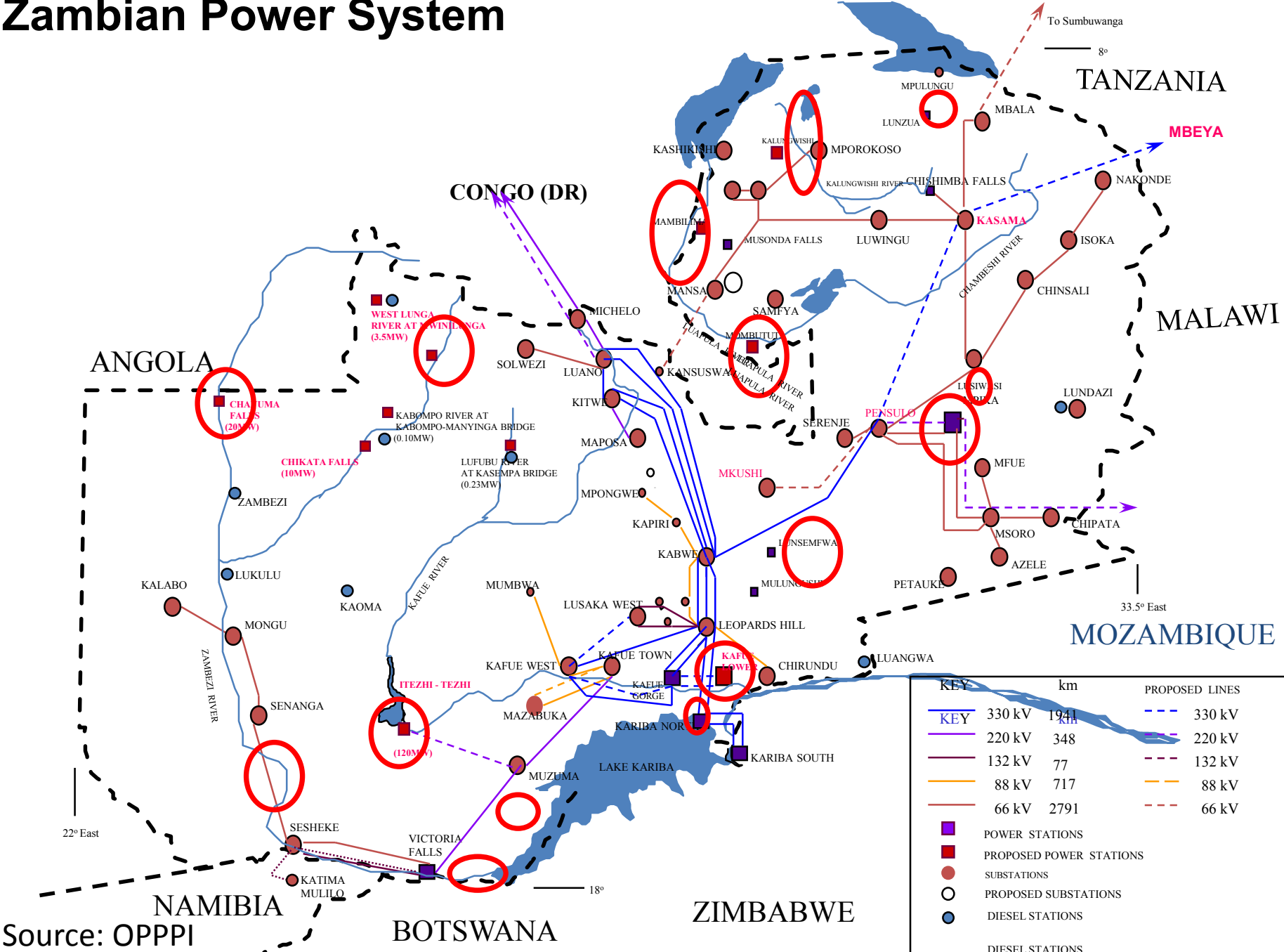
ELECTRICITY CONSUMPTION PER SECTOR



Opportunities

- Economic activities
- Hydro-dominated power generation
- Scaling solar opportunity
- ReFit program
- Low electricity access
- Regulatory reforms
 - Establishment of Grid Codes and Open Access regime
 - Standard PPAs

Zambian Power System



Power Generation Capacities

COMPANY	POWER PLANT	(MW)	CAPACITY FACTOR (%)
Zesco	Kariba North	720	69
	Kariba North Extension	360	10
	Kafue Gorge	990	69
	Victoria Falls	108	89
	Lusiwasi		40
	Chishimba		>89
	Musonda		63
	Lunzua		52
Zesco/ Tata	Hydro	120	58
Maamba	Coal	300	80
LHPC	Lunsemfwa	34	76
	Mulungushi		64
Ndola Energy	HFO	50	
CEC	Diesel	80	0

Wind Sun Energy Zambia Limited



The Company

- Private company, limited by shares
- Incorporated in 2009 by 2 Engineers with a view to participate in the realisation of increased access to electricity in Zambia
- Supplied over the Zambian market over 5000 LED lighting systems, thereby contributing to the reduction of energy consumption by lighting of over 4,000 kWh per day
- WE BELIEVE THAT EVERY KWH SAVED LIGHTS UP THE NEXT HOUSE!

Strategic Positioning

- Highly experienced Engineers, Financial Managers, Business Strategists and Environmental specialists
- Positioning ourselves as a private investor/operator of RE generation facilities

Our 3-Year Vision

To attain annual Renewable Energy Power generation of 2,000MWh, and savings from Energy Efficiency strategies of 50,000MWh .

Our 3-Year Objectives

- Install and operate at least 4MW of mini and small hydro generation, connected to off-grid networks.
- Install and operate at least 1 grid tied solar network supplying a business, shopping mall, school, hospital or residential premises
- Retrofit at least 100,000 LED lights

Current Projects

- Pre-feasibility of a mini grid, 200km east of Lusaka
- Reconnaissance studies for micro/ mini hydro generators
- Operation of a distribution network in Lusaka with 1000 connected customers

Project No. 1: Development of a Solar hybrid mini grid at Mpanshya Mission (St. Lukes' Mission Hospital), 200km east of Lusaka

CURRENT PROJECTS

Mpanshya Mission Solar hybrid Mini grid

- Mission Hospital operated by the Bolomeo Sisters
- 200km East of Lusaka
- Infrastructure under the mission includes
 - Hospital, catering for over 60,000 people
 - Nursing college with over 300 students
 - Nursery school
 - Home for the aged with an adjacent bakery business
 - 40 housing units

Mpanshya Mission Solar hybrid Mini grid: Problem Statement

- The place has no electricity, save for 80kVA diesel generator:
 - At least 300l diesel/ week
 - If available, only operates for 3 hours/ day
 - Many frequent breakdowns
- Cooking is by firewood
 - Carbon footprint
 - Deforestation
- Grid electricity
 - At least 1 year away
 - Provides opportunity for GetFit

Mpanshya Mission Solar hybrid Mini grid



Mpanshya Mission Solar hybrid Mini grid



Untitled Map

Write a description for your map.

Legend

-  CHC
-  Feature 1
-  Feature 2
-  Feature 3
-  Feature 4
-  Landscape from Mpanshya
-  Mpanshya
-  Power Station
-  Powerstation



Google Earth

Image © 2017 DigitalGlobe

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1000 ft

Mpanshya Mission Solar hybrid Mini grid: Project Status

- Initial study
 - Needs assessment
 - MoU of intent with the Mission
 - Conceptual desktop designs
- Next steps:
 - Load assessment
 - Detailed feasibility

Project No. 2: Development of a Mini hydro Pilot Project along Manshya river, Shiwangandu

CURRENT PROJECTS

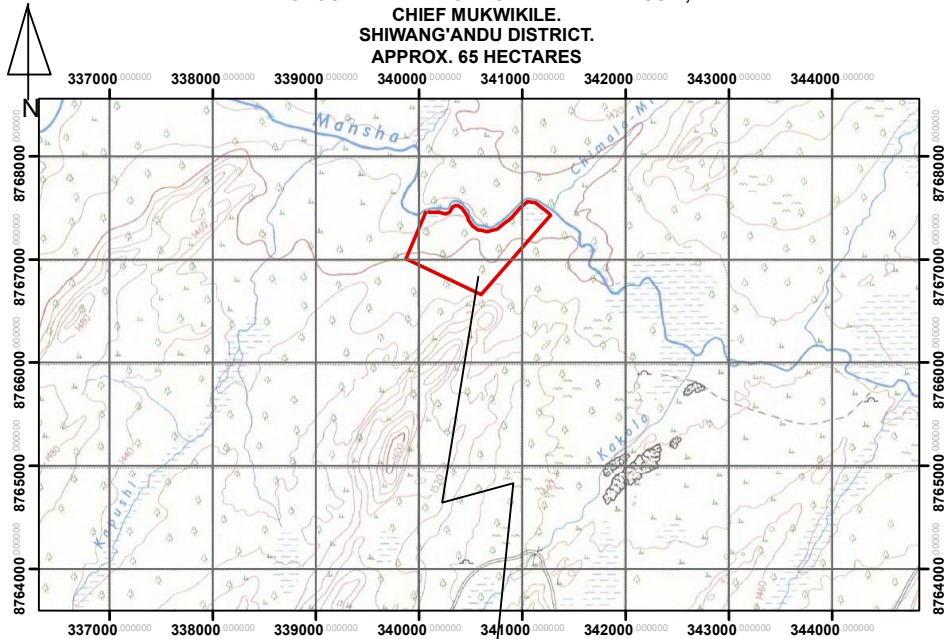
Manshya river Mini hydro

- Development of a mini hydro demonstration project, using hydro-kinetic technology:
 - Either to feed into an off-smart-grid, supplying schools, health centres and households within a determined catchment area, or
 - Feeding into an existing network supplied by 1MW Shiwang'andu hydro power plant, which grid is isolated with a possibility to connect to the national grid
- Site is in Muchinga Province, 750km North-East of Lusaka
 - Downstream of 1MW Shiwang'andu hydro owned by the national utility

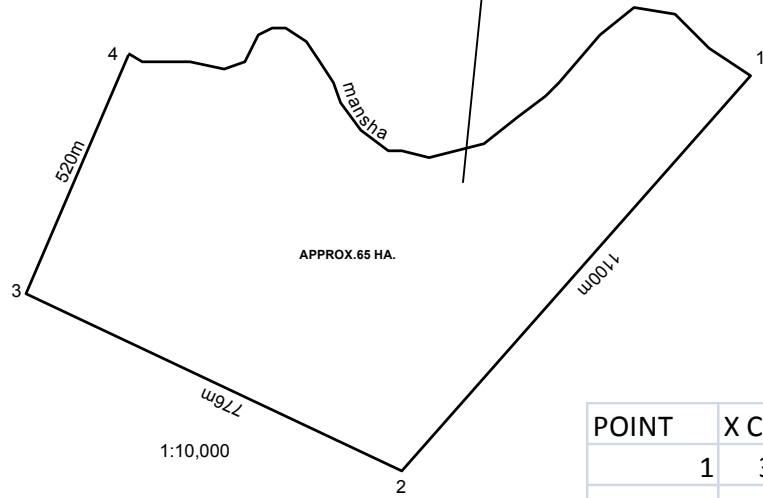
Manshya river Mini hydro



PROPOSED FARM PLOT FOR CHANDA LINUS K,
 CHIEF MUKWIKILE,
 SHIWANG'ANDU DISTRICT.
 APPROX. 65 HECTARES



Scale 1:50,000
 sheet no. 1131B1



1:10,000

POINT	X COORD	Y COORD
1	341320	8767361
2	340574	8766560
3	339881	8766904
4	340074	8767380

Hydro kinetic turbine





Our Interest

- Project promoters and financiers
 - Feasibility stage of the pilot project
- Replicability of the technology is very high
 - Possible collaboration with Rural Electrification Authority of Zambia

THANK YOU VERY MUCH!
VIELEN DANK!