

RENEWABLE ENERGY SITUATION IN BOTSWANA

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1.INTRODUCTION

- ❖ Botswana is a land locked country in Southern Africa with size 582,000 square KM
- ❖ Population was 2, 038 228 in October 2011 (CSO)
- ❖ Botswana Power Corporation (BPC) is the sole entity that generates, transmits and distributes electricity within the country
- ❖ Total plant capacity of Morupule Coal Power Station is 132MW
- ❖ 600 MW coal fired power station is being built

- ❖ Max Demand of electricity was 553 MW in 2011
- ❖ Rural Access to electricity was 53 % in 2011
- ❖ About 80 % of electricity imported from neighboring countries (68 % from South Africa, 10 % other countries in the region)

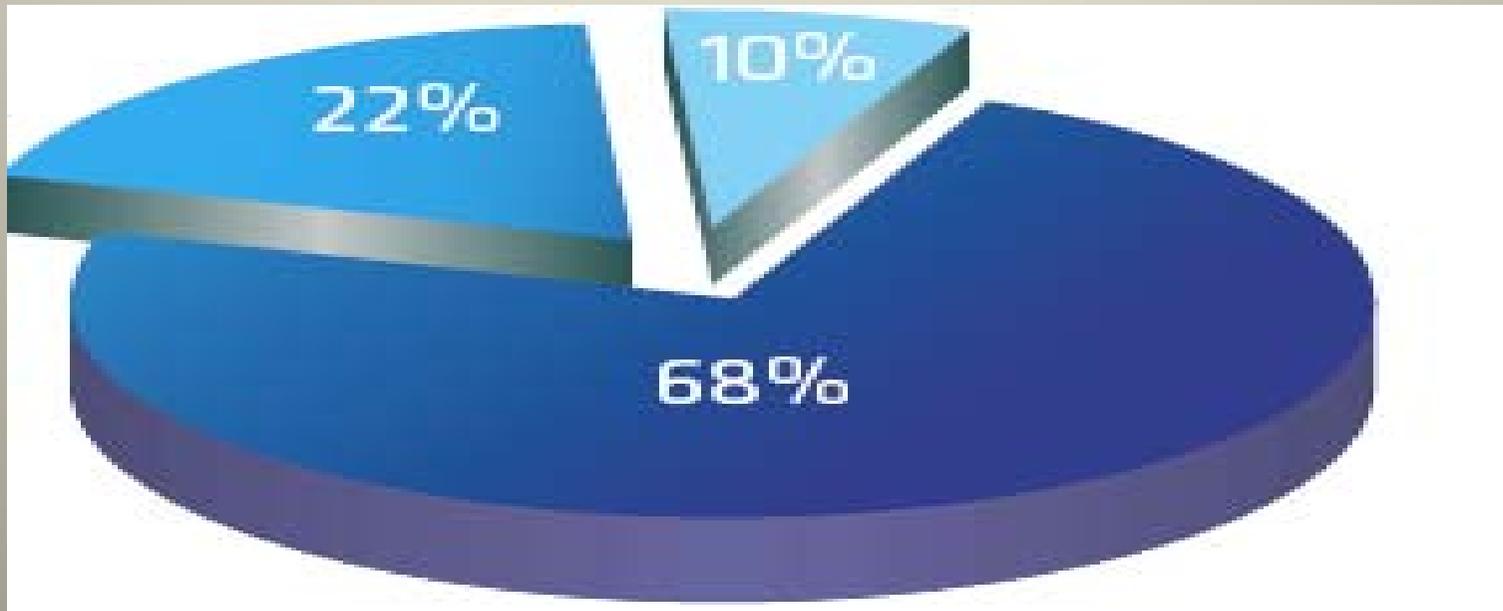


Figure 1 : Electricity from utilities (source: Botswana Pwer Corporation Annual Report: 2011)

- ❖ Solar radiation estimated at 21 MJ/m² per day
- ❖ Solar contributes less than 1 % of Primary Energy

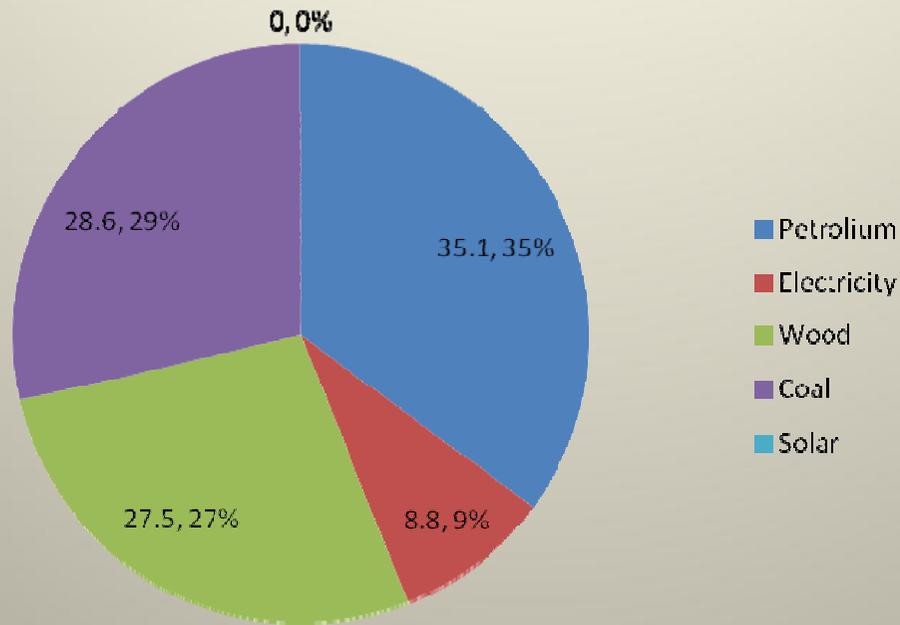


Figure 2: Primary Energy Supply Chart (source: Division of Energy Affairs)

2. Common RET Applications in Botswana

- ❖ Water pumping using solar PV and windmills
- ❖ Solar PV Street-lighting
- ❖ Water heating by solar water heaters
- ❖ Solar (PV)Homes systems used for lighting & to power appliances

Commonly Applied RETs:

- ❖ Solar PV and Solar Thermal
- ❖ Wind Speed low at about 4.5 m/sec (further studies required)
- ❖ Biomass not fully used (few projects done by private companies like hotels)

2. ENERGY DEMAND IN THE COUNTRY

Energy Demand by Subsectors under the following energy sources; petroleum, electricity, coal, firewood, solar:

❖ When fuelwood is considered

Sub sector	%
❖ Household	42.0
❖ Transport	23.3
❖ Mining	19.10
❖ Government	5.8
❖ Trade and Hotels	4.5
❖ Manufacturing	4.3

3. Institutions working with RET applications

3.1. Botswana Technology Center (BOTECH)

3.2. Rural Industries Promotions Company Botswana (RIPCO – B)

3.3. Botswana Power Corporation Lesedi (BPC – Lesedi)

- ❖ BPC Lesedi is a subsidiary company of Botswana Power Corporation (utility company)

3.4 Some projects are done by government in remote areas through private companies

- ❖ The projects mostly include solar home systems and solar water heaters in government employees staff houses

4. BPC Lesedi Projects

- ❖ BPC Lesedi (Pty) Ltd was formed in 2008 for the purpose of rolling out the RE-Botswana Renewable Energy-based Rural Electrification Project.
- ❖ This project is a collaborative effort between the Government of Botswana, the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF).
- ❖ BPC Lesedi is a joint venture between BPC and Electricite de France (EDF) that is specifically mandated to undertake rural electrification in Botswana using a franchise model
- ❖ The company targets to connect RE to 25% of villages that are not grid-electrified, 49 % of unconnected households in grid electrified villages and all of the country's 99 settlements which are not electrified.
- ❖ The project, which is not for profit, would be funded through equity and loans

BPC Lesedi Project Objectives:

- ❖ To provide clean, safe and affordable energy to rural dwellers living in areas where the provision of grid supply is uneconomical.
- ❖ To help reduce the degree of deforestation and to minimise the amount of carbon emissions arising from the use of fossil fuels for lighting and cooking purposes.
- ❖ To promote the development of sustainable small businesses and the creation of employment opportunities, primarily in areas where such opportunities are generally scarce

BPC Lesedi Project Achievements by 2011:

- 200 solar home systems sold
- 330 efficient cooking stoves
- 280 rechargeable lanterns
- Three recharging stations were built in the following villages: Kgope, Dikgatlhomg and Medie

5. Projects by Botswana Technology Centre (BOTEC)

5.1 A 5.7 kW centralised solar PV power plant in a remote village of Motshegaletau (pilot project)

- ❖ A mini grid built to distributed 220 V AC power
- ❖ 12 domestic connected, a bar, clinic and streetlights
- ❖ Loads supplied: lights, decoders, TVs, refrigerators
- ❖ To be duplicated to other parts of the country
- ❖ Funds available the project is to be replicated in other village

5.2 Solar Chimney Project which BOTEC is currently researching on:

- ❖ This is still a pilot project and it uses the chimney effect to turn the turbine
- ❖ If successful it will be rolled out to the villages

5.3 Solar Water Heaters (SWH) Thermal Testing Facility

- ❖ Built to address the problem of substandard products
- ❖ Established to test the performance & efficiency of SWH
- ❖ Though complete testing of SWH expected to start in 2013

5.4 Solar (PV) Streetlights

- ❖ A project funded by the governments of Finland and Austrian and hosted by the Development of Southern Africa (DBSA)
- ❖ This is part of Energy and Environment Partnership Programme (EEP) by Finland and Austria with Southern and Eastern Africa
- ❖ Funding is about 100, 000 Euros
- ❖ Cost of a streetlight is P10,000.00
- ❖ Major components are 80 W solar module, 12 V 105 Ah battery, 30 W energy efficient lamp , electronic controller, streetlight pole & lamp fitting
- ❖ During the day the streetlight is off as battery charging takes place & at night the streetlight switches on
- ❖ Most of the material supplied by local distributors except the light fixture

Benefits from Solar Streetlights

- ❖ The areas where the lights will be installed include schools, bus stops, government yard offices, government yard clinics and other dark areas around the villages
- ❖ Thirty lights will be installed in one village in each of the six districts identified
- ❖ The lights will empower both men and women through income generation.
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- ❖ Children's education will also be enhanced through evening studies and other educational activities

6. OTHER RE PROJECTS BEING DONE

- ❖ 1.3 MW Solar PV Power Station being built in Botswana funded by the Japanese Government
 - ❖ PV - grid connected power plant
 - ❖ Most of the components purchased from Japan including solar modules
 - ❖ Project expected to be completed by December 2012
- ❖ Up 200 MW concentrated solar thermal power station bankable feasibility study funded by World Bank and African Development Bank
 - ❖ Done by the government through Botswana Power Corporation (utility company)
 - ❖ Botswana Technology Centre involved in the project as a key stakeholder to advise
 - ❖ 3 sites identified but consultants to choose the most appropriate site

7. REFERENCES

1. National Development Plan 10. Gaborone. Botswana.
2. Botswana Power Corporation Annual Report 2011
3. Botswana Energy Draft Policy: 2009. Gaborone Botswana

Thank You !!!!