MINISTRY OF MINERALS, ENERGY AND WATER RESOURCES

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Department of Energy

- VISION
  - *The Ministry of Minerals, Energy and Water Resources is fully committed to complete customers' satisfaction in the provision of products and services in accordance with best international practice*

- MISSION
  - *To formulate and coordinate national energy policy and programmes and facilitate availability of effective, reliable and affordable energy services to customers in an environmentally sustainable manner*

Botswana Energy Outlook

- Energy resource base dominated by huge coal reserves ~ 212 billion tons
- No known petroleum reserves
- Woody biomass loading ranges from 3.6-4.3 tons per ha per annum of shrub savanna to 4.8-10.6 tons per ha per annum for dense forest
- Mean annual solar insolation of 21 MJ per m^2 per day ~ one of the highest radiation levels in the world
- Average wind speeds ranges of 2.0-3.5 m/s ~ low for viable wind based power generation

Bio-energy in Botswana

- Meets 1/3 of the national energy needs and provides
- About 74% of rural community depend on fuelwood
- Mainly open-fire cooking

Key Biomass Energy Challenges

- SHORTFALL: Biomass energy management is fragmented among various institutions with limited coordination
- Generally given a low priority in energy planning
  - lack of awareness
- Elevated consumption of fuelwood by government institutions
  - Localised fuelwood scarcity from over-harvesting
  - Cutting down of live trees to meet demand

Biomass Energy Strategy (BEST)

- BEST initiative launched by GTZ and Partnership Dialogue Facility of the EU Energy Initiative (EUEI PDF)
- To ensure that biomass energy is produced, supplied and used in a socially, economically and environmentally sustainable manner
- Reflected on 4 biomass types
  - Woody biomass, wet biomass, energy crops and residues

BEST key results

- Woody biomass stocks and the fuelwood demand projected to increase over time
- There are considerable resources of wet biomass (municipal liquid waste, abattoir waste), residues (chicken manure, municipal solid waste) and selected energy crops that can be exploited to provide modern biomass energy
  - Chicken manure ~ energy potential of 680MWh per annum
  - Municipal waste ~ potential of 7GWh
  - Biodiesel from Jatropha ~ substitute 10% of diesel demand by 2020

Technology & Project Intervention Options

- Interventions proposed in BEST

Biomass Type	Intervention
Woody Biomass	Improved fuelwood and coal stoves, community natural resources management, exotic and indigenous tree planting, gasification of invasive species, production of pellets, briquettes, charcoal and supply of coal to areas of fuelwood scarcity
Wet Biomass	Household, institutional and SME biogas digesters using municipal liquid waste, chicken manure and abattoir waste
Residues	Land fill gas, incineration and gasification using municipal solid waste (MSW)
Energy crops	Pilot biodiesel and bio-oil; ethanol and biogel production projects

Government initiatives

- Eradication of fuelwood use by Government institutions
  - Switch to alternative energy sources (LPG, electricity, coal)
- RE Botswana (BPC, GTZ, UNDP)
  - Dissemination of improved woodstoves

Government Initiatives cont..

- Feasibility study on the production and use of biofuels in Botswana
  - Potential in bio-ethanol (sweet sorghum) and bio-diesel (*Jatropha curcas*)
- Installation and operation of a 50 million litre/year flexi biodiesel processing plant by 2012
- development of a 20 000 ha jatropha plantation for feed-stock production

Government Initiatives cont..

- Biogas pilot project
  - For cooking
  - Village electrification
- To revive old and abandoned community biogas digesters for water pumping

Thank you