

**GOVERNMENT OF ZIMBABWE**

**FINAL DRAFT ENERGY POLICY**

**11 March 2008**

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## ACRONYMS AND ABBREVIATIONS

AFREPREN	African Energy Policy Research Network
BOTEC	Botswana Technology Centre
CBM	Coal Bed Methane
CSIR	Centre for Scientific and Industrial Research
CSO	Central Statistical Office
CTL	coal to liquid technology
DDC	District Development Committee
DSM	Demand Side Management
GHG	greenhouse gas
GJ	gigajoule
GWh	gigawatt hour
IPP	Independent Power Producer
ITDG	Intermediate Technology Development Group
kWh	kilowatt hour
MDG	Millennium Development Goal
Mt	million tons
MW	megawatt
NEP	National Energy Policy
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NOCZIM	National Oil Company of Zimbabwe
PA	Practical Action
PDC	Provincial Development Committee
PRA	Petroleum regulatory Authority
PV	photovoltaic
REA	Rural Electrification Agency
REF	Rural Electrification Fund
REP	Rural Electrification Program
REPGA	Regional Petroleum and Gas Association
RERA	Regional Electricity Regulators Association
RETs	Renewable Energy Technologies
RRA	Regional Research Association
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SCEE	Southern Centre for Energy and Environment
SDP	System Development Program
SIRDC	Scientific and Industrial Research and Development Centre
SMEs	Small to Medium Enterprises
TCF	tera cubic feet
ZEDC	Zimbabwe Electricity Distribution Company
ZERC	Zimbabwe Electricity Regulatory Commission
ZESA	Zimbabwe Electricity Supply Authority

ZETCO	Zimbabwe Electricity Transmission Company
ZETDC	Zimbabwe Electricity Transmission and Distribution Company
ZPC	Zimbabwe Power Company
ZRA	Zambezi River Authority

# **NATIONAL ENERGY POLICY FOR ZIMBABWE**

## **1. PREAMBLE**

### **1.1 Energy and Development**

The provision of energy services is an essential ingredient of socio-economic development. Energy is required in meeting the basic human needs such as food, shelter, health, transport, education etc.

Although Zimbabwe has vast and diverse energy resources, the per capita energy consumption is only 24.7 GJ (MOEPD Energy Balance, 2000) compared with an average of 200 GJ for the developed countries.

Appropriate policies need to be put in place in order to facilitate the development and utilisation of these resources to meet the socio-economic needs of the population in a sustainable manner.

## **2. Background**

### **1.1 Energy Situation in Zimbabwe and the region**

The main sources of energy used in Zimbabwe comprise of coal, fuel wood, electricity and petroleum fuels. According to the latest (2000) national energy balance, fuel wood provides the bulk (53%) of the total energy supply, followed by coal (20%), liquid fuels (14%) and electricity (13%). Access to electricity is estimated nationally at nearly 40%, but access to electricity in the rural areas of the country is much lower, at about 19%. This is to be contrasted with the African continent average of around 17 % ( IEA, 2000). South Africa has a national grid electrification rate of 66%, Zambia 20% and Mauritius 100% (AFREPREN Energy Data, 2004). Rural communities meet 80 – 90% of their energy requirements from traditional fuels, mainly fuel wood and 15 – 30% of urban households use wood as the main cooking fuel. Coal, charcoal and LPG are used by very few (<1%) households (Central Statistical Office, 2002). The use of fuel wood as an energy source is not sustainable as the rate of use exceeds the natural annual yield.

Zimbabwe is currently facing a shortage of electrical energy due to generation shortfalls and has to import more than 35% of its electricity requirements from neighbouring countries (Mozambique, South Africa and Zambia) and the Democratic Republic of Congo. Power imports now constitute a significant foreign currency outflow and have put a strain on the foreign currency situation.

Zimbabwe has also to import all its petroleum fuels (brought into the country by pipeline from Beira to Harare) at a great cost to the country in terms of scarce foreign currency. The country has thus been experiencing erratic fuel supplies over the past four years or so due to foreign currency shortages facing the country. The southern

part of the country is better supplied by rail from South Africa via Beit Bridge. Further distribution of the fuel to the rest of the country is done by a combination of rail and road transport.

Most of the rural communal areas of Zimbabwe are facing fuel wood shortage due to, inter alia, the clearing of the land for agriculture and unsustainable fuel wood harvesting.

Over half (55%) of the annual coal production is used in industry for steam raising and for power generation; 38% is used in agriculture for tobacco curing. With the current production problems facing Hwange Colliery and the transport constraints by the National Railways of Zimbabwe, coal deliveries to consumers have become erratic. Also because of the high transport costs some farmers are switching to fuel wood for tobacco curing, resulting in deforestation in the tobacco farming areas. The land resettlement exercise has also created challenges to do with the provision of infrastructure and facilities, such as electricity for irrigation, petroleum fuels distribution network, roads, schools, hospitals etc.

About two thirds (65%) (CSO Population Census 2002) of Zimbabwe's estimated population of 11.6 million live in rural areas but the rate of urbanization is increasing. A rate of natural increase of 1.3% per annum was realised over the period 1992 – 2002. Education development is a high priority and the national literacy rate is about 97%.

Agriculture is the mainstay of the economy and almost 90% of the population who live in the rural areas derive their livelihood from agriculture.

The Government policy gives priority to poverty reduction and the fiscus is geared towards increased social sector expenditure, expansion of the rural infrastructure and redressing social and economic inequality such as through land reform.

## **2.2 Zimbabwe's Energy Resource base**

Zimbabwe's energy resource base is diverse but is largely dominated by the country's vast coal reserves with proven reserves, based on exploration work carried out to date standing at 12 billion metric tonnes situated mostly in the northern /north-western part of the country. Zimbabwe's coals are generally good quality with calorific values ranging from 20 to 32 MJ/kg.

Current estimates of coal bed methane (CBM) put CBM resource potential at 40 terra cubic feet (TCF), about 66% of the known gas resources in Southern Africa. Zimbabwe still needs to establish the full potential and commercial feasibility of exploiting this energy resource.

The hydropower potential is concentrated along the Zambezi River with potential also at many minihydro sites especially in the Eastern Highlands. An annual daily average radiation of 20 MJ/m<sup>2</sup> is received over Zimbabwe. The annual yield of fuel wood from natural forests has been estimated at 4.6 million tons. Bagasse is produced as a waste in the production of sugar from sugar cane in the Lowveld (at Triangle and Hippo Valley Estates). It is estimated about 1.5 million tons of bagasse are produced annually.

**Comment [S1]:** Please include the actual number of minihydro sites this information is readily available.

With a strong agricultural base, Zimbabwe also produces large quantities of agricultural wastes.

Wind speeds over Zimbabwe (average 3 m/s) are too low for most wind-based power generation technologies although wind energy has been used in some areas of the country for pilot power generation project and for water pumping.

Exploration for oil in the Zambezi Valley concluded that the area has potential for gas. Mana Pools has potential to reservoir 27500 million cubic meters and the Mid Zambezi basin can reservoir 27000 million cubic meters (0.953 TCF) of gas. Further exploration work needs to be carried out to establish conclusively the position. More exploration work is required to quantify and characterise uranium and geothermal energy resources in the country.

**Comment [S2]:** The Units for the gas should be in tera cubic feet for uniformity purposes

The limited information available on energy resources is scattered in various institutions and needs to be collated.

### 3.3 Institutional Arrangements and Governance

The Ministry of Energy and Power Development has overall responsibility for energy issues in Zimbabwe. The terms of reference of the Ministry include policy formulation, performance monitoring and regulation of the energy sector as well as research, development and promotion of new and renewable sources of energy. The Ministry supervises and oversees the performance of energy parastatals, ZESA and NOCZIM.

The electricity sector is still dominated by the Zimbabwe Electricity Supply Authority Holdings (ZESA Holdings) which, through its subsidiaries Zimbabwe Power Company (ZPC), and the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) generates, imports and distributes all electrical energy in the country. A few small private generators run either as stand alone systems in remote communities or as back-up systems by large urban companies and in some schools and hospitals.

Reforms introduced in the electricity sub sector have led to the unbundling of the then Zimbabwe Electricity Supply Authority (ZESA), the creation of an independent



stand alone Rural Electrification Agency (REA) and the creation of a regulator for the electricity industry, the Zimbabwe Electricity Regulatory Commission (ZERC).

Reforms in the sub sector were meant to encourage private sector participation such as through independent power producers (IPPs).

Notable IPPs (which existed before the reforms) include Rusitu Power Corporation, Hippo Valley Estates and Triangle Limited. Between them they have an installed capacity of about 70MW.

The Zambezi River Authority was established by parallel legislation in Zimbabwe and Zambia under the Zambezi River Authority Act to operate, monitor, and maintain the Kariba dam complex and any other dams on the Zambezi River.

The Petroleum Act, passed in 2006, provides for the establishment of the Petroleum Regulatory Authority (PRA), which will licence and regulate the petroleum industry; promote the development of efficient procurement, sale and distribution of petroleum products as well as safeguard the interests of consumers of petroleum products. Plans are at an advanced stage to introduce a sector-wide Energy Regulatory Commission with an overall mandate across all energy sub-sectors.

Other players in the sector include the Ministry of Mines and Mining Development (MMD), responsible for coal, coal bed methane resources and for any exploration work for energy minerals (e.g., coal, coal bed methane, petroleum fuels) and other (non-energy mineral) resources. The Ministry supervises Hwange Colliery Company, which owns the largest operational coal-mine in Zimbabwe. It sets the policy on coal utilisation and approves the price of coal whether the coal is to be used for energy or any other application.

The Scientific and Industrial Research and Development Centre (SIRDC) carries out research and development in renewable energy as well as energy conservation. The Forestry Commission is active in the area of woody biomass as their mandate covers all state forests, which are a major source of fuel wood.

The University of Zimbabwe's Department of Mechanical Engineering and the Chinhoyi University of Technology run programs in Renewable Energy. The Harare Polytechnic has done some trials on *Jatropha curcas* and biodiesel.

Non Governmental Organisations (NGOs) active in renewable energy technology promotion include ZERO, Southern Centre for Energy and Environment (SCEE), Practical Action (ITDG) and SAFIRE. Local and Rural District Councils under the Ministry of Local Government provide area-based planning at the levels of districts and provinces. Other important stakeholders include oil companies, solar distribution companies, contractors, and independent power producers. The efforts of all these institutions need to be coordinated and given direction.

Institutional arrangements for the energy sector are dominated by the government, which is critical for national energy security.

#### **4.4 Energy Sector Constraints (Issues) and Opportunities**

From the foregoing background and from the experience gained from the various energy sector programs and activities, both local and international, a number of issues /challenges and opportunities have been identified. These help shape the energy policy which is expected to not only address these issues and challenges but also to be based on and take advantage of the opportunities.

#### **5.5 General Issues**

The key issues that cut across all or most of the energy sub-sectors in Zimbabwe and which need to be addressed by policy are currently:

- i. Poor access to modern / commercial energy especially for the rural population, stifling economic development and contributing to social hardships in the rural areas.
- ii. Critical energy shortages throughout the economy marked by erratic electricity, coal and petroleum fuels supplies in the country.
- iii. Incomplete /outdated and scattered information on some energy resources (for example coal bed methane, geothermal, uranium and fuel wood) and other factors militating against effective planning and policy formulation.
- iv. Policy shifts and uneconomic prices dog the sector. The lack of consistent energy policy and uneconomic prices of energy have resulted in very limited investment in the sector.
- v. Weak institutional arrangements resulting in poor coordination between MOEPD and other key development agencies e.g. there is no effective mechanism for MOEPD to input into developmental programs of local authorities.
- vi. Lack of or inadequate investment in the energy sector contributing to the energy shortages. There has been no significant investment in new generation in the electricity sub-sector over the past twenty years.
- vii. Uneven energy sector regulation and governance.
- viii. Difficulties in accessing finance for energy projects and programs.
- ix. There has been limited technology transfer and access for technology on the international market in such areas as coal to liquid, CBM. Local capacity to develop applied technology solutions to meet the energy needs of the country has also been constrained.
- x. Lack of skills and expertise and a weak human resources base in key institutions. Like all the other sectors of the economy, the energy sector has lost qualified and experienced personnel to brain drain.
- xi. Failure to identify and respond to the special needs of the low income populace in both rural and urban areas. The low income end up paying more for their energy due to their use of low grade fuels, inefficient appliances, purchasing fuel in small quantities and high barriers to modern energy (wiring costs, costs of appliances to access electricity).
- xii. Energy for rural development has not achieved the prominence and priority it deserves especially as the majority of the population relies on agriculture and resides in rural areas.

- xiii. Energy and the environment: the critical shortage of fuel wood, use of firewood in place of coal for tobacco curing and brick making contribute towards environmental damage. In turn application of ‘non clean’ coal technologies lead to poor GHG mitigation and its impacts on climate change.
- xiv. Energy and gender: Energy sector interventions have failed to maximise on the economic strengths of women hence the economy continues to rely on predominantly gender biased economic sectors.

### 3. Sub-Sector Issues

#### 1.1 Electricity Sub-sector

- Benefits of sector reforms are not being realised as reforms are still incomplete and taking long to be finalised.
- Poor capital base and inadequate resources for infrastructure and equipment maintenance leading to supply disruptions.
- Uneconomic tariffs leading to low investment and poor service delivery.
- The rural electrification program (REP) has been under funded due to the uneconomic tariffs and slow energy uptake by target communities.
- Idle / under utilised infrastructure (e.g. Small Thermals).
- Brain drain and loss of experienced /qualified personnel.
- Inadequate foreign currency supplies for power imports

#### 2.2 Petroleum Sub-sector

The petroleum sub-sector has experienced the following challenges:

- Inadequate foreign currency supplies leading to fuel shortages
- Inefficiencies in procurement and distribution
- Idle / under utilised infrastructure (pipeline, storage facilities)
- Unstable policies on pricing, procurement and blending. For instance, the petrol/ethanol blending introduced in the early 80’s was discontinued. Plans are now to re-introduce it.
- Unclear regulatory framework.
- Limited national capacity to respond to global fuel supply disturbances

**Comment [S3]:** Qualify the statement

#### 3.3 Coal and CBM

- Access to technology such as coal to liquids to reduce dependence on imported petroleum fuels has been limited.
- High transport costs for coal from colliery to centres of demand
- Environmental concerns of coal use especially pollution
- Inefficient pricing mechanisms for power station coal.
- Resource confirmation and characterisation for CBM cannot be done due to lack of technology and funds.

- Dependence on few mines leading to insecurity in supply and high transport and distribution costs from the mines to demand centres.
- No meaningful competition on the supply side leading to poor performance by the few suppliers.

### **3.4 Biomass**

- Unsustainable exploitation of wood fuel and environmental effects such as deforestation
- Inefficient utilisation (open fire)
- Unmonitored health impacts of fuel wood use in rural households
- Poor penetration of cleaner biomass burning/conversion technology
- Absence of regular and systematic data collection and analysis for planning.

### **3.5 Renewable Energy**

Limited penetration by renewable energy technologies (RETS) due to:

- No clear policy and strategy
- Limited qualified /experienced personnel
- High up front costs for the promotion of the technologies.
- Poor appreciation and demonstration of benefits
- Poor back up service especially in remote rural areas
- Lack of foreign currency to import components
- Application of ineffective marketing strategies (technology drive)
- Limited local experience with some technologies e.g. briquetting.

### **3.6 Research and Development**

- Weak policy – research linkages. Policy makers and researchers are working independently of each other instead of collaborating.
- Poor funding of research institutions and programs
- Brain drain from and limited capacity in research institutions
- Little or no collaboration among research institutions
- Poor documentation and dissemination of research work/results
- Limited involvement of private sector in research initiatives

### **3.7 Energy Efficiency and demand side management (DSM)**

- Low prices of energy that do not encourage energy efficiency
- Tariff structures that do not reflect energy sector constraints and priorities
- No clear policy and strategy, including standards and incentives.
- Lack of awareness of energy saving potential.
- Lack of appreciation of co-benefits of energy management.

- Old technology in industry and low technology turn over due to foreign currency shortages.
- Private sector not involved in energy sector planning processes.

### **3.8 Opportunities**

- Abundant energy resources (coal, CBM, solar energy, hydro)
- Technology is available on the international market such as CTL
- Opportunities for regional cooperation programs (SADC, NEPAD) exist.
- Public and private sectors have high quality skills that can be harnessed to serve energy sector requirements.

## **4. POLICY PROPOSALS**

### **4.1 The Need for a policy**

A national policy is not only a promise by Government to its citizens that it will take a certain course of action or follow specific principles but it is also a commitment by the Government to achieve tangible results pursuant to that policy. Through this national energy policy statement, Government is informing its citizens and the international community of its priorities and direction in the energy sector. The policy statement hopefully answers some of the questions prospective investors might have such as on priority areas, tariffs and tariff setting, shareholding requirements and incentives for private investors in the energy sector. Energy researchers will also know the priorities for energy research, etc.

This policy statement is an attempt by the Ministry of Energy and Power Development to put in place a framework to promote energy development in the country. Due to the pervasive nature of energy, the implementation of some of the policy proposals contained in this document depends on input from and cooperation of other Ministries.

### **4.2 Context of the National Energy Policy**

Policy does not operate in a vacuum. It has to take cognisance of the environment in which it will operate: local, regional and international.

#### **4.2.1 National Context**

The NEP is being produced when the country is going through economic hardships marked by high inflation, shortages of foreign currency, and flight of experienced personnel from most institutions. There has been no significant new investment in the sector and the current environment of uncertainty is not conducive to new investment. Energy infrastructure and other complementary infrastructure (coal mining, transport) are collapsing from lack of maintenance and from under capitalisation. Critical energy shortages are being experienced particularly electricity and petroleum fuels. Poverty is on the increase particularly in the rural areas where the situation is aggravated by the ravages of HIV/AIDS. Unemployment rates are reported to be over 70%. Rural to urban migration is increasing, causing massive strain on service provision in urban areas such as health, transport and water. On the positive side, new energy resources in the form of coal bed methane and biodiesel hold promise for a brighter future.

#### **4.2.2 Regional Context**

As a member of SADC, Zimbabwe is bound by the SADC cooperation agreement to follow the programs at the regional level. Through the SADC Treaty, Southern African member States are committed to find common ground in their national policies and plans for the integration process to move forward through a regional approach to sector planning and coordination and a high level of harmonization of macro-economic policies.

For the energy sector, the SADC Energy Protocol aims to enhance regional cooperation through harmonization of national and regional energy policies, strategies and programs on matters of common interest based on equity, balance and mutual benefit to member States. Also included in the cooperation is the establishment of a regional database to facilitate the exchange of information among institutions as well as regional energy policy formulation and planning.

The harmonization of regional energy sector policies, legislation, rules, regulations and standards by 2006, strengthening centres of excellence in energy research by 2008, 100% connectivity to the regional power grid by 2012 and availability of modern energy to 70% of the rural population by 2018 are targets under the Regional Indicative Strategic Development Plan (RISDP) on energy. The Plan recognizes the critical role energy plays in economic development, first as domestic requirement and also as a factor of production and thus considers supply of energy as part of the overall strategy for poverty alleviation.

NEPAD Energy objectives also include increasing access to reliable and affordable commercial energy in Africa through exploiting new and renewable sources of energy. Other objectives of NEPAD include rationalizing the territorial distribution of energy resources, reversing environmental degradation associated with biomass use, exploiting and developing hydropower potential of river basins, integrating transmission grids and gas pipelines and reforming and harmonizing petroleum regulations and legislation.

The most developed regional cooperation experience has been gained in the electricity sub-sector through the Southern African Power Pool (SAPP). The SAPP provides experiences, which could be extended to the renewable energy sub-sector as part of the harmonization process. In 2002, SADC approved the formation of a Regional Petroleum and Gas Association (REPGA) to facilitate the harmonisation of liquid fuels and gas policies in the region. REPGA is still to be operationalised. On the research front three of Southern Africa's leading science and technology institutions namely, the Council of Scientific and Industrial Research, CSIR (South Africa), Scientific and Industrial Research and Development Centre, SIRDC (Zimbabwe) and Botswana Technology Centre, BOTECH founded the Regional Research Alliance (RRA) in July 2005. The main objectives of the alliance are to promote, pursue and implement projects with high regional impact, relevance and benefit to people of the region, to create synergy by pooling resources, to develop regional knowledge networks and enhance regional capabilities through human resource development and sharing of best practices.

A Regional Electricity Regulators Association (RERA) has also been established to coordinate and harmonise regulation in the energy sector.

### 4.2.3 International Context

On the international scene, the most prominent issues relate to the volatile oil prices and insecurity of fuel supplies caused by instability in the Middle East and Persian Gulf. International oil prices are now hovering around US\$80 – 90 /barrel. Efforts have now been increased to develop technologies such as coal-to-liquids which reduce dependence on petroleum fuels. The international environmental debate is dominated by the need to address the issue of global warming caused by greenhouse gas emissions from energy related activities such as the burning of fossil fuels (coal, petroleum). This has resulted in increased efforts to promote the use of renewable energies and to increase energy efficiency. The Kyoto Protocol on GHG emissions has been ratified by a number of countries. Zimbabwe is still to ratify the Treaty.

The Millennium Development Goals (MDGs) are an important reference point for the country's aspirations for sustainable development. The development of nuclear energy which is seen as a clean technology as far as global warming is concerned has however been surrounded by political controversy arising from the perceived potential threat that nuclear energy can be used for military purposes.

**Comment [S4]:** Qualify the statement

### 4.3 The Policy Formulation Process

The policy was produced from a synthesis of previous efforts done to come up with a national energy policy as well as from inputs by key stake holders obtained through six Provincial Consultative Workshops and a National Consultative Workshop held in Harare. This Draft incorporates inputs from the stakeholders.

### 4.4 Goals and objectives of the NEP

The goal of the National Energy Policy is to meet the energy needs of the people of Zimbabwe for social and economic development in a sustainable manner. Here sustainability is used in its broadest sense to include elements of efficiency, economic, social and environmental sustainability.

### 4.5 Objectives of the National Energy Policy

The National Energy Policy should achieve the following responses:

- Preservation of an appropriate balance between energy demand and supply;
- Balanced use of natural resources with environmental considerations;
- Established clear definition of roles between the state, private sector and other players; and
- Take cognisance of the context within which it is being formulated.

In this respect the broad objectives of the NEP are as follows:



- Increasing access to affordable energy services to all sectors of the economy;
- Stimulating sustainable economic growth by promoting competition, efficiency and investment in the sector and thus achieving poverty eradication.
- Improving institutional arrangements and governance in the energy sector
- Improving capacity in the various players in the energy development and delivery chain.
- Improving the availability of energy information.
- Managing energy related environmental and health impacts
- Improving energy security through diversity in supply and regional cooperation and energy trade
- Mainstreaming gender in energy planning and development.

## **5. Broad Policy Proposals and Actions**

For Zimbabwe to achieve the above objectives it will need to take certain broad actions as outlined below. The broad actions will be further developed to give time-bound and resource-determined implementation strategies, in a separate exercise.

### **5.1 Increasing access to affordable energy services to all sectors of the economy**

This is aimed at bringing about equity between all sectors of the population of Zimbabwe (rural or urban, rich or poor) and thus contribute to the economic growth of the country as a whole. To make energy affordable to the poor, the following policy options will be adopted;

- Cost of infrastructure development will be borne through least cost funding options with public sector programs absorbing the bulk of essential services cost.
- Promote decentralised renewable energy systems for rural areas where these are more attractive than grid extension;
- Build capacity of local enterprises by training managers and other personnel to run the different aspects of energy business including project planning and formulation, accounting, construction and maintenance.

### **5.2 Stimulating sustainable economic growth and poverty eradication**

Energy should cease to be a barrier to development. Measures to ensure sustainable development will include:

- Application of cost reflective tariffs with an efficient and transparent subsidy regime for the poor.
- Matching of energy supply to income generating projects to enable energy users to meet the cost of supply.
- Promotion of the use of modern energy fuels in rural areas especially coal and electricity as well as the promotion of renewable energy technologies

### **5.3 Improving institutional arrangements and energy sector governance**

Improved institutional arrangements will be achieved by:

- Clarifying roles and responsibilities of various energy sector institutions.
- Developing and supporting interface between energy and other sector players.
- Improving coordination at grassroots level to improve efficiency of policy delivery and resource use by integrating energy and other development activities.

- Encouraging bottom up approaches in energy sector planning and development.
- Completing the already started processes of energy sector reforms and integrating continual improvement into the development of the new structures.
- Increasing transparency by enabling government institutions to maintain a coordination role whilst taking advantage of the operational skills in the private sector for more technical activities.
- Improving the skills base within the Ministry of Energy and Power Development in order to handle more advanced planning and development management methods suitable for a growing economy.
- Enabling effective regulation without applying restrictive control over pricing regulations.

#### **5.4 Improving capacity in the various players in the energy development and delivery chain**

To enable the various players in the energy delivery chain to effectively play their respective roles it is necessary that they be capacitated to:

- Manage the energy sector through efficient policies, application of advanced clean technologies, close the gap between energy supply and development planning and assessment and evaluation of energy investment programs.
- Urban and rural communities should also host capacity to contribute to sector development plans and to identify and benefit from opportunities arising from the needs of the sector.
- Improving local capacity in terms of skills to enable use of energy resources

#### **5.5 Improving the availability of Information for policy and planning**

In order to improve the availability of adequate and up to date information for policy and planning purposes, the following actions will be taken:

- Maintenance of an up to date energy resource database with recommendations for conversion technologies.
- Prioritising research programs and motivating participation of the best technical skills in the programs.
- Creation of facilities to leverage research funding.
- Adoption of a consultative process for data collection and analysis to enable use of data by various sector players.
- Facilitation of user education on key sector issues and policies.
- Promotion of collaboration with regional and global research partners.

## **5.6 Managing energy related environmental and health impacts**

To reduce the negative environmental impact of energy resource exploitation and use through :-

- Improved access to commercial energy for the poor and rural communities to ameliorate the negative environmental and health impacts such as deforestation and indoor air pollution associated with unsustainable harvesting of biomass and the use of low level technology such as open fires.
- Set up minimum performance standards for equipment, vehicles and factories to reduce emissions from industry and transport.
- Provision of training and capacity building for maintenance and technology upgrades, which will not only yield efficiency improvements but will also reduce energy related emissions.
- Development of a sector specific environmental impact assessment process that links technology and technology evaluation to environmental priorities.

## **5.7 Promoting investment in the energy sector**

Investment in the energy sector will be promoted through :

- Completion of feasibility studies for strategic projects so as to reduce transaction costs for new entrants into the sector.
- Development of an tariff system that enables prices to account for cost of supply.
- Matching major energy production investments to production so as to complete the viability analysis without restricting investment structuring.
- Development of incentives to promote private sector participation in the energy sector

## **5.8 Improving energy security through diversity in supply**

Security of energy supply can be enhanced by keeping all energy options open. No resource or option should be dropped without economic and environmental justification. Diversity will also be achieved by sourcing energy from different geographic regions where possible. In this respect both local and import opportunities will be examined thoroughly before an investment decision is made.

Government will:

- Make efforts to develop a mixture of supply options for each demand sub-sector.
- Support and encourage research and development and give incentives to develop new options especially renewable energy (wind, solar, biomass) and minihydro for decentralised energy supply will be supported.

- Support the development of more efficient technologies for biomass utilisation
- Promote (on the basis of sound economic criteria) through strong public-private sector participation, coal - to -liquid technology , biodiesel, and ethanol blending to reduce the country's dependence on imported petroleum fuels
- Participate in regional energy trading and cooperation such as power pooling (SAPP) and joint regional projects in electricity and petroleum fuels.

## **6. POLICY PROPOSALS FOR THE SUPPLY SIDE**

### **6.1 Policy Objective**

The main objective is to promote a conducive environment for energy sector players to identify and develop opportunities for energy supply that promote sustainable development.

### **6.2 Guiding Principles**

#### **6.2.1 Capacity Building**

- Promote regional industry synergies to encourage use of various competencies to benefit energy supply.
- Promote scientific and technology capacity building to meet energy challenges.
- Facilitate understanding and acceptance of the economic linkages that exist between a) Industry b) Learning Institutions c) Government d) Economic needs e) Natural resources f) Foreign investors

#### **6.2.2 Security of Supply Infrastructure**

Penalise vandalism of energy and energy use related infrastructure by employing punitive measures.

#### **6.2.3 Coal and CBM**

- To ensure adequate supplies of coal to meet the energy requirements of the country in a cost-effective and sustainable manner, specifically coal for power generation, industrial steam-raising and for tobacco curing.
- To ensure adoption of clean coal technologies that extend the life of the resource whilst minimizing environmental impacts of coal use.
- To explore the techno-economic feasibility of new coal technologies such as coal gasification and coal-to-liquid conversion.

#### **6.2.4 Electricity**

To ensure adequate and quality electricity supplies to meet national requirements and export any surplus to the region by,

- Maintaining a dynamic system development planning process.
- Facilitation of efficient use of existing infrastructure.
- Promote and protect private sector participation in the electricity sector.

- Encourage co-generation of electricity from biomass (bagasse, forestry residue )
- Facilitate grid extension that would unlock new supply opportunities in remote areas
- Employ a pricing mechanism that ensures investor interest and security of supply

### **6.2.5 Renewable energy**

- To develop the use of renewable energy resources for both small and large-scale applications.
- To encourage and promote the use of economically viable renewable and alternative energy technologies.
- To support (initiation, co-ordination and monitoring) research efforts aimed at establishing the viability of renewable and alternative energy technologies.
- To incorporate renewable energy in national development plans

### **6.2.6 Petroleum fuels**

The policy objectives for the supply side of petroleum fuels are:

- Enhance security of supply through diversity of supply sources
- Reduce the fuel import bill by developing local fuel sources
- Maximise efficiency of the supply system through aggregate procurement
- Enhance and maintain reliability at sustainable levels by maintaining adequate strategic reserves
- To continue investigation into potential sources for fuels
- To secure the economy against price fluctuations caused by global or regional disturbances through appropriate price stabilisation measures.
- Optimise use of transport infrastructure to minimise supply cost. This can be achieved by maximising the use of the oil pipeline and the rail system.
- To continue to investigate supply strategies that support industrialisation such as refineries and coal distillation
- To continue to investigate incorporation of biofuels in the sub-sector.
- To encourage the participation of indigenous business in the fuels industries.

### **6.2.7 Biomass**

Biomass energy encompasses energy from fuel wood, forestry and agricultural wastes (including bagasse); ethanol from sugar cane; biogas and biodiesel. The policy priority is to improve the management of the biomass resources at the local level, which boils down to a land use issue – essentially agriculture and forestry.

Biomass fuels management entails:

**a) Establishing an energy resource database on:**

- Wood resources, forestry residues and agricultural wastes.
- Potential for commercial production of biofuels.
- Geographical Information system based resource assessment

**b) Enhance resource base by:**

- Facilitating production and management of biomass through afforestation programs implemented as an integral part of rural development activities.
- Developing mechanisms for recovering and collecting sawmill and agricultural waste for power generation.
- Develop the biomass sub-sector and encourage private sector participation
- Supply commercial biomass fuel for commercial purposes
- Encourage local authorities to supply sustainably harvested biomass to urban communities to discourage uncontrolled harvesting.

**c) Controlling extraction rates through legislation and regulation.**

- The rate of extraction of commercial firewood from controlled forests will be set at levels that can be sustained.

**Comment [S5]:** Add more flesh and qualify the statement.

### **6.2.8 Nuclear Energy**

Government to promote the development and application of nuclear energy for peaceful purposes by:

- Facilitating international co-operation and the transfer of nuclear technology;
- Establishing, implementing and maintenance of a legislative and regulatory framework to govern the application of nuclear energy for the protection of public health, safety, the environment as well as national and international security;
- Establishing a competent and independent authority responsible for the implementation of the legislative and regulatory framework.



## **7. DEMAND SIDE AND ENERGY EFFICIENCY INTERVENTIONS**

Zimbabwe has had several studies highlighting the importance of demand side actions in managing energy use. These findings have however not resulted in action to implement measures that match energy supply to energy use by the energy suppliers intervening on the end user side. Demand side interventions will therefore be promoted as low cost measures to defer supply side investment and mitigate the adverse impacts of energy supply shortages.

### **7.1 Key Policy Objectives**

To reduce the cost of energy supply that is motivated by lack of co-ordination between energy suppliers and energy users.

### **7.2 Guiding Principles**

- All energy supply interventions will consider demand side options before new investment.
- All demand side interventions will be based on rigorous assessment of the cost and benefits that accrue to the energy supplier and energy user so as to enable equitable sharing of benefits.
- Demand side management includes awareness raising, direct investment, incentive schemes, and time of use metering.
- Energy wastage should be met by direct penalties both for suppliers and users.

#### **7.2.1 Households**

Despite its consumptive nature, household energy use is a function of income, settlement type, available energy infrastructure and energy price. Household energy use is linked to both indoor and outdoor environment quality with fuel-wood being a major driver for indoor air pollution and deforestation. Household energy use often includes energy use for small-scale enterprises, which start within households.

Policy interventions for this sub-sector are recommended as follows.

- To determine a minimum standard for basic household energy services, against which progress can be monitored over time and will facilitate the widening of access to such a basic level of energy services, including fuels and related appliances.
- To enable and encourage households to adopt energy use habits that minimize stress on the supply systems.
- To encourage co-operation between energy suppliers and households so as to bridge the communication gap that exists between them.
- To achieve and maintain accuracy of energy subsidies so as to minimize cost and increase effectiveness.

- To adopt lifecycle assessment of policies and device based measures so as to reduce negative impacts of interventions.
- To enable households to participate in local and national energy planning discussions.

### **7.2.2 Industry**

Industry is the major user of commercial energy and is, through revenue generated, also critical to the ability of energy suppliers meeting demand. In addition to being a major energy user, industry supplies the energy using devices that are employed by all sectors of the economy. The skills base in industry is therefore critical to successful implementation of demand side measures in all sectors. Industry's ability to respond to policy signals makes it a strategic partner for the public sector in managing energy use.

The following policy measures are recommended:

- Government through MOEPD should commit itself to the promotion of energy efficiency and the development of holistic programs for industry, mining, and commerce.
- The Government should ensure supply quality and reliability standards in the electricity supply industry.
- Energy pricing should represent cost of supply including any subsidies that may be applied.
- The formation of public private sector partnerships should be encouraged as a way of optimising application of technology in energy use management.
- Industry will be viewed as a partner in both production and use of energy hence will be consulted during the energy planning processes.
- New policies and measures will continue to be introduced with the intention of achieving production at the lowest energy cost.
- Equipment efficiency standards and codes of practice to enhance energy efficiency will be introduced.
- Industry will be given capacity through appropriate training to implement demand side management.
- Industry with capacity to produce demand side equipment will be encouraged and supported to manufacture such equipment for local and regional application.
- Industry will be encouraged to adopt cogeneration options.
- MOEPD will develop a comprehensive energy demand database, which will be available to all interested parties at a reasonable price, if necessary.

### **7.2.3 Agriculture**

The agricultural sub-sector is diverse with various activities and skills levels. Energy issues in the agricultural sector have been dominated by availability,

access, pricing and issues of efficiency of use. Priority has been placed on increasing access to modern energy particularly electricity. Farm mechanisation is seen as a key to increasing yields. Climate variability and climate change have increased the visibility of value of mechanisation as water needs to be pumped from wells and dams and tillage needs to be completed in limited periods as the farm lands become more and more sensitive to water shortage. Energy use efficiency in the agricultural sub-sector would help in reducing production cost thereby improving access to food by poorer communities. Some efficiency improvement measures carry the co-benefit of conservation tillage, which is desirable under the current climatic patterns. Skills development is currently an essential component of all on farm interventions. Most farmers are transiting from small scale farming to larger scale and more complex production methods. The following measures would enable propagation of more efficient energy use habits in the sub-sector. The Ministry of Energy and Power Development will collaborate with sector Ministries and authorities to implement actions to achieve the following.

- All farmer training should include tuition in energy use efficiency and energy planning. Technology selection and operation as well as planned maintenance become a natural component of this training.
- Technology selection and technology evaluation should consider energy use at all stages of farm production planning.
- Energy intensity of production should be included as criteria when recommending regional production programs.

#### **7.2.4 Commerce**

The commercial sub-sector is defined as the office and retail sub-sector including such facilities as hotels, shops and shopping malls, education facilities and places of assembly. The major energy uses in this sub-sector are lighting, space conditioning, refrigeration, and office equipment. Unlike the industry sub-sector energy use in the commercial sub-sector is closely related to building structures and layout. Studies in Zimbabwe have revealed inefficiencies in energy use for space conditioning and lighting. Alternative energy for water heating would help in reducing the demand for electrical energy. Rented buildings offer a greater challenge for energy efficiency improvement due to the separation of responsibility for investment and payment of the energy bill. Architectural design is a key factor in improvement of building energy use efficiency. Architectural features such as ceiling height, window sizes and glazing and building thermodynamic properties affect use of artificial lighting and air conditioning. Policy interventions should therefore influence building design, appliance selection and building usage.

- Property developers will be encouraged to adopt low energy intensity building designs.
- Given the long life of buildings and the future impacts of climate change, all local authorities will be encouraged to adopt lifecycle assessment of building

developments for energy use and to include energy efficiency of building designs in requirements for building plan approvals.

- Measures will be taken to improve the energy performance of equipment in buildings and ensure appropriate maintenance for older equipment disposed of during the retrofits.
- Property developers and owners will be encouraged to adopt higher efficiency lighting designs.
- Building operators will be encouraged to integrate energy management in all operational activities including water usage and space conditioning.
- Local authorities will be encouraged to incorporate energy management in urban planning.

### **7.2.5 Transport**

The transport sector in Zimbabwe is dominated by road and rail transport. Air transport is limited to the National Airline and a few civilian and military aircraft. Opportunities for demand side interventions are mostly in the road and rail transport sector. The dominance of small bus operators in the passenger sub-sector is a major driver for energy use patterns.

Policy interventions will be as follows:

- Continual fuel use data collection will be used to motivate policy change in the transport sector.
- Energy supply will be used to influence decisions in vehicle selection especially for major road transport users.
- National energy accounts will be drafted to include energy use by vehicle type and application.
- Energy use will be adopted as a parameter for guiding vehicle selection and licensing.
- Public-private sector partnerships will be formed to raise awareness on vehicle energy use amongst transport operators.

### **7.2.6 Small and Medium Scale Enterprises**

Viability of SME's is closely linked to availability and access to modern energy and technology. Most SMEs operate from shared premises and do not have separate energy meters. Small enterprises tend to acquire energy in small quantities which in turn increases their production cost.

The following policy interventions will be employed to assist SMEs:

- Initiatives will continue to be implemented to promote alternative energy supply options for small scale enterprises.
- Training on entrepreneurship development will be made to include energy use efficiency.
- Programs will be implemented to raise awareness on available energy technologies on the market.

- Partnerships will be formed with financing institutions to encourage the adoption of more efficient devices.

### **7.2.8 Funding of DSM Programs**

Government will put together mechanisms for sustainable funding of DSM programs which will ensure security of energy supply through appropriate incentives for suppliers, DSM service providers and consumers

## **8. ENCOURAGING RENEWABLE ENERGY INVESTMENT**

To address the barriers to wider use of renewable energy and attract investment in the sub-sector the Government will:-

- Prepare and publicise a national strategy on renewable energy technologies which will:
  - Encourage research to generate information on renewable energy resources and markets, identify the users' needs and identify renewable energy technologies matching the users' needs and preferences to be promoted.
  - Promote the incorporation of renewable energy in national development plans
  - Ensure the establishment and the strengthening of enabling institutional, legal and regulatory frameworks for the renewable energy sector, and especially in the area of public-private sector partnerships.
  - Promote increased community public and private sector participation in renewable energy development and dissemination for poverty alleviation, empowering women, income generation and enterprise creation.
  - Incorporate renewable energy education and public awareness in educational curricula at all levels.
  - Promote cooperation in the region and also with other developing countries, for removing barriers, sharing lessons and increasing the uptake of renewable energy technologies.
- Develop entrepreneurial, business and technical skills in renewable energy, especially for SMEs. This is meant to give capacity in both business and technical skills in renewable energy technologies
- Develop standards for renewable energy equipment and codes of practice for enterprises involved in renewable energy development and supply.
- Establish a Renewable Energy Development Fund which could be funded from the fiscus and any levies imposed on fossil fuels.

## **9. ENERGY FOR RURAL DEVELOPMENT**

It has been established that for energy to be an engine for rural development, energy services should be provided with a bias towards income generation; and that a wide range of energy supply options should be made available in order to match the

energy options to demand, in order to accommodate the poorer and smaller entrepreneurs. In this direction:

- Government will adopt a more consultative bottom-up approach to ensure that the energy needs of the rural people are more accurately understood.
  - Rural energy development will be decentralised to place rural people themselves (particularly small scale enterprises) at the heart of planning and implementation.
  - Rural energy development will be integrated with other programs in the rural areas such as agriculture, health, education, and infrastructure, social and political factors. A broad range of institutions will thus be involved: Ministries of Agriculture, Health, Women's Affairs and Youth Development, NGOs as well as the Rural Electrification Agency. MOEPD will develop effective interface mechanisms downward to provincial and district level, establishing links with relevant provincial and district level institutions via respective sub-committees. of PDCs and DDCs
  - Training and capacity building will be carried out to develop a critical mass of locally trained manpower with requisite skills in a broad range of disciplines: technical, economic, development and socio-cultural. The training and capacity building will be targeted at SMEs, and personnel from developmental agencies and other Government institutions working at grass roots level:.
  - Government will fund rural electrification programs of REA from the fiscus. Rural electrification programs should not only address grid extension but also employ other renewable energy technologies such as solar, wind; mini and macro hydro and biomass based decentralised systems. In addition, the Expanded Rural Electrification Program already approved by Government will be promoted. The program will fund end use equipment associated with rural electrification such as:
    - Irrigation equipment
    - Agro processing equipment
    - Other SMEs , etc
- 
- In addition, new and flexible financing mechanisms will also be explored to assist rural entrepreneurs and households to access energy and income generating equipment.
  - Access to modern energy sources will be increased.
  - Efficient conversion technologies will be promoted.

## 10. CROSS CUTTING ISSUES

## **10.1 Information and planning**

To address the constraints arising from lack of data on energy:

- A consolidated and up-to-date national energy database, supported by necessary legislation will be developed through a consultative process.
- Capacity for data collection and database development and management within MOEPD will be developed.
- Government will support research and development to generate data for policy and planning and institute measures for effective data management.

## **10.2 Research and Development**

Policy measures for this section will incorporate:

- a) Promoting energy related research for better exploitation of the country's energy resources (solar wind, geothermal and nuclear)
- b) Developing or adapting energy technologies to suit the Zimbabwean situation
  - i. Coal-to-liquids technologies
  - ii. Renewable energy technologies (solar, wind, biodiesel, ethanol etc.)
  - iii. Electricity production, transmission and distribution
- c) Encouraging research into the socio-cultural aspects of energy use in order to foster wider adoption of more efficient energy technologies and practices.

To achieve this, the Ministry of Energy and Power Development will endeavour to improve research co-operation between public and private researchers as a way of optimising resource use.

## **10.3 Energy and Environment**

The policy objective is to achieve environmentally sustainable energy development. An environmental impact assessment will be required for all major energy projects.

Policy for this sector will include:

- Playing a meaningful role in regional and international environmental programs.
- Developing energy in an environmentally sustainable manner.
- Minimising the adverse environmental effects of energy exploitation and use.

#### **10.4 Energy pricing**

The policy objective is to encourage investment in the energy sector and for sustainable development through efficient energy use.

- Energy prices will be set by a regulator at levels that cover costs, allow reasonable return and permit the needed expansion, maintenance and upgrading of facilities and services.
- Subsidies, where they are needed to protect the poor, will be provided by general budget and will be targeted to benefit the intended poor.

#### **10.5 Energy and gender**

For gender sensitive energy development, Government will:

- Accelerate the representation of women at all levels and in all spheres of energy development and management activities;
- Ensure gender balance by defining the key roles played by women, men and children so that there is no gender discrimination in the ownership and management of the various energy projects.

#### **10.6 Regional and International energy trading and co-operation**

To increase energy security through diversity of supply, Government will promote regional and international energy trade and cooperation through :-

- Regional interconnection of electricity grids and active participation in the Southern African Power Pool (SAPP);
- Development of new energy supply projects to satisfy the needs of the region.
- Rationalisation and coordination of the acquisition and distribution systems for petroleum products ;
- Participation in regional projects such as joint procurements, third party processing agreements and regional refineries;
- Harmonisation of legal and fiscal policies and regimes on the production, transport and distribution of energy products;

#### **10.7 Investments in the energy sector**

To promote investment in the energy sector and thus achieve adequate energy supplies, Government will

- Promote and protect private sector participation in the energy sector through appropriate incentives and mechanisms
- Promote public-private partnerships
- Ensure energy pricing that supports private investment

A detailed package of investor incentives and procedures will be produced.

A specialised investment unit will also be set up in the Ministry of Energy and Power Development.



## **10.8 Institutional Framework**

- Government will improve institutional arrangements to bring about more effective coordination of the various activities of the many players in the sector, clarify roles, foster accountability and transparency and bring about synergy between the different players in the sector..
- Government will withdraw from directly managing energy markets and will leave this to the private sector and parastatal set up for that purpose.
- A special Project Planning and Promotion unit which can attract highly skilled staff will be set up in the Ministry of Energy and Power Development.
- Regular consultations between Government and stakeholders will be introduced.

## **10.9 Legislative Reforms**

The relevant legislation the (Electricity Act (Chapter 13: 19), the Petroleum Act (Chapter 13:22) and the proposed Gaseous Hydrocarbons Bill) will be amended to take into account the establishment of the energy sector regulator.

## **11 Way Forward**

The broad policy statements enunciated in this document have to be translated into broad action plans in a comprehensive National Energy Policy Implementation Strategy that will detail the strategies and action plans by all players in the energy sector in order to achieve policy objectives set out in this document.

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