

**BASIC ENERGY INITIATIVES  
IN SOUTHERN AFRICA**

**Survey by the**

**SOUTHERN AFRICAN RESEARCH AND DOCUMENTATION CENTRE  
(SARDC)**

**For the**

**NORWEGIAN EMBASSY IN MOZAMBIQUE**

**April 2009**

## CONTENTS

ACRONYMS .....	2
1. INTRODUCTION .....	5
1.1 Background .....	5
1.2 Focus of the survey .....	5
1.3 Purpose of the survey .....	6
1.4 Geographical scope .....	6
1.5 Methodology .....	6
2. GLOBAL AND REGIONAL CONTEXT.....	8
2.1 The energy debate .....	8
2.2 Legal framework of basic energy .....	9
2.3 Clean Development Mechanism and its link to basic energy .....	9
2.4 Forms of basic energy, technologies and initiatives .....	10
3. EXISTING AND PLANNED PROJECTS/PROGRAMMES.....	13
3.1 Regional Projects/Programmes .....	13
3.2 National Projects/Programmes.....	17
4. IDENTIFIED GAPS, CONSTRAINTS AND OPPORTUNITIES .....	47
5. CONCLUSION.....	48
6. WAY FORWARD AND RECOMMENDATIONS.....	49
REFERENCES .....	50
APPENDIX.....	51
List of Organisations Consulted.....	51
ICPs and other Regional Organisations .....	54

## ACRONYMS

ADEL	Agência de Desenvolvimento Econômico Local
ADEM	Agências de Desenvolvimento Econômico Local de Moçambique
ADES	Association pour le Développement de l'Énergie Solaire Suisse-Madagascar
AfDB	African Development Bank
AFRECA	Association for Renewable Energy Cooking Appliances
AGAMA	Renewable Energy consulting business in South Africa
AREED	African Rural Energy Enterprises Development
ATTT	Association of Tanzania Tobacco Traders
BEST	Basic Energy Services and Technologies
BnM	Basa njengo Magogo
BORDA	Bremen Overseas Research and Development Association
BOTEC	Botswana Technology Centre
BSPSC	Battery and Solar Power Services marketing Centre CADECOM Catholic Development Commission
CBOs	Community Based Organisations
CBS-DEWATS	Community Based Sanitation and Decentralised Wastewater Treatment Systems
CDM	Clean Development Mechanism
CEAS	Centre Ecologique Albert Schweitzer
CEF	Central Energy Fund
CER	Certified Emission Reduction
CFLs	Compact Fluorescent Light Bulbs
CH4	Methane gas
COFAMOSA	Committee for the Facilitation of Agriculture between Mozambique and South Africa
CSD	Commission for Sustainable Development
CSIR	Council for Scientific and Industrial Research
CPAR	Canadian Physicians for Aid and Relief
DANIDA	Danish Development Agency
DBSA	Development Bank of Southern Africa
DEAT	Department of Environmental Affairs and Tourism
DFID	United Kingdom: Department for International Development
DGIS	Directorate General for International Cooperation
DME	Department of Minerals and Energy
DRFN	Desert Research Foundation of Namibia
EASE	Enabling Access to Sustainable Energy
ECB	Electricity Control Board
EDC	Energy Development Cooperation
EICS	Efficient Institutional Cook Stove
EMCON	Namibian Consulting firm
EnAf	Energising Africa
ESKOM	Electricity Supply Commission
ERAP	Energy Reform and Access Program
ESMAP	Energy Sector Management Assistance Program
ETG	Energy Thematic Group
ETI	Energy Technology Institute
EU	European Union
EUEI	EU Energy Initiative for Poverty Eradication and Sustainable Development

EZE	Evangelische Zentralstelle für Entwicklungshilfe
FCE	Fianarantsoa-Côte Est
FID	Development Intervention Fund
FEMA	Forum of Energy Minister of Africa
FOEN	Federation Office for the Environment
FINNIDA	Finland's Department for International Development Cooperation
FUNAE	Fundo Nacional de Energia
GEEREF	Global Energy Efficiency and Renewable Energy Fund
GEF	Global Environment Facility
GEF SGP	Global Environment Facility's Small Grants Programme
GFSE	Global Forum on Energy for Sustainable Development
GHG	Greenhouse Gas
GNESD	Global Network on Energy for Sustainable Development
GENEZ	Gender and Energy Network of Zimbabwe
GOAL	Irish Humanitarian and development organisation
GVEP	Global Village Energy Partnership
GTZ	German Agency for Technical Co-operation
HERA	Household Energy for Sustainable Development
HIVOs	Humanistic Institute for Cooperation with Developing Countries
IBEK	Improved Basic Earthmound Kiln
ICPs	International Cooperating Partners
ICT	Information Communication Technology
IFC	International Finance Corporation
INCO	Confirming the International Role of Community Research
IPP	Independent Power Producer
ISES	International Solar Energy Society
JICA	Japanese International Co-operation Agency
JIRAMA	Jiro sy rano Malagasy
JREC	Johannesburg Renewable Energy Coalition
LPG	Liquid Petroleum Gas
MDGs	Millennium Development Goals
MFPs	Multifunctional Platforms
MoFA	Ministry of Foreign Affairs
NAGs	National Advisory Groups
NAMBESP	Namibia Biomass Energy Savings Project
NAMREP	Namibia Renewable Energies Programme
NEPAD	New Partnership for Africa's Development
NGOs	Non Governmental Organisations
OVE	Organisation for Renewable Energy
PCL	Pioneer Carbon Limited
PIH	Partners in Health
POCA	Maputo ceramic stove
POS	Plant Oil Stove
ProBEC	Programme on Basic Energy and Conservation
PROTEC	Programme for Technical Careers
PSP	Private Sector Participation
PV	Photovoltaic
RE	Renewable Energy
REA	Rural Energy Agency
REEECAP	Renewable Energy and Energy Efficiency Capacity Building Programme

REEEI	Renewable Energy and Energy Efficiency Institute
REF	Tanzania Rural Energy Fund
REPIC	Renewable Energy and Energy Efficiency Promotion in International Co-operation
SACCOS	Savings and Credit Cooperative Society
SADC	Southern African Development Community
SAPP	South African Power Pool
SARDC	Southern African Research and Documentation Centre
SBRSA	Sugar Beet South Africa
SEALAS	Sustainable Energy Activities in Local Areas of Sofala
SDC	Swiss Agency for Development and Cooperation
SECO	Swiss State Secretariat for Economic Affairs
SEDC	Sustainable Energy and Development Centre
SEDI	Sustainable Energy and Development Institute
SEED	Sustainable Energy for Environment and Development
SELF	Solar Electricity Light Fund
SESSA	Sustainable Energy Society of Southern Africa
SIDA	Swedish International Development Agency
SIRDC	Scientific and Industrial Research and Development Centre
SMEs	Small to Medium Enterprises
SPARKNET	Sustainable energy Policy And Research Knowledge Network
SPI	Solar Panel Information
SPV	Solar Photovoltaic
SVOs	Straight Vegetable Oils
SWH	Solar Water Heaters
TaTEDO	Tanzania Traditional Energy Development and Environment Organisation
TDAU	Technology Development and Advisory Unit
TED	Technology for Economic Development
TRAID	Textile Recycling for Aid and International Development
UAC	Ukrainian Hryvnia
UNDP	United Nations Development Programme
UNDTCD	United Nations Department of Technical Cooperation for Development
UNFCCC	United Nations Framework Convention on Climate Change
WFP	World Food Programme
ZERO	Zimbabwe Environment Resources Organisation

# 1. INTRODUCTION

## 1.1 Background

In southern Africa, as in most developing countries, the goal of the energy sector is to provide reliable and sustainable energy services in the most efficient and cost-effective ways to spur economic and social development with the ultimate objective of eradicating poverty.

The significance of energy in achieving sustainable development has been highlighted in many international forums, notably the World Summit on Sustainable Development held in Johannesburg in 2002. None of the UN Millennium Development Goals are attainable without major improvements in the quality and quantity of energy in developing countries including the Southern African Development Community (SADC).

The role of basic energy to the majority of the population in the SADC region and the need to develop and promote improved and more efficient energy access solutions were underscored during a meeting of the International Cooperation Partners that make up the SADC Energy Thematic Group (ETG) held in Gaborone, Botswana, in December 2008. At the meeting, concern was raised on the possible risk of introducing overlapping activities. The meeting therefore suggested carrying out a brief assessment of existing and planned basic energy initiatives in the region. Norway, as the lead agency of the ETG, commissioned the Southern African Research and Documentation Centre (SARDC) to carry out the survey.

## 1.2 Focus of the survey

Though basic energy seems a common term in the energy field, it has different meanings to different people. While in developed countries basic energy may mean the energy required to power household requirements, such as air conditioning, heating and washing machines, in developing countries basic energy would mean that used for cooking, lighting, heating and small-scale enterprises.

Basic energy is generally understood to mean the minimum amount of energy needed per person and is given as 35kg of Liquid Petroleum Gas (LPG) or 120 kilowatt hours of electricity per person per year.<sup>1</sup> Some see basic energy as alternative renewable energy sources, while others view it as clean energy solutions crucial in reducing global warming.

In this survey, basic energy refers to energy for low-income groups, mostly the rural population and urban poor, and that which is off the main electricity grid. Basic energy initiatives are usually on a small scale mainly to benefit the local community. The purpose of basic energy initiatives is to address energy poverty by providing improved access to sustainable, efficient and affordable clean energy as well as responding to climate change mitigation and adaptation strategies. The initiatives include micro-scale, new and renewable energy sources, energy efficiency and conservation programmes.

This survey includes various kinds of initiatives, such as development of new and improved technologies among which are second generation stoves,<sup>2</sup> solar water heating, solar cooking, solar lanterns, solar driers, small-scale Photovoltaics (PVs), mini-hydros, windmills to pump water or, biomass serving new and improved technologies, biogas digesters for grinding mills, and gel stoves. It also includes research programmes such as the development of testing facilities and of equipment standards, training and education

---

<sup>1</sup> From the interview with Lasten Mika of Practical Action, Zimbabwe office

<sup>2</sup> Improved cooking stove which utilizes advanced combustion techniques with much lower emission levels than the first generation stoves as they utilised a two-stage combustion process.

programmes, marketing and commercialisation, and carbon financing<sup>3</sup> of basic energy services and technologies, for example the Clean Development Mechanism (CDM) and voluntary markets.

The idea of basic energy promotes self-reliance among the low-income groups at the same time promoting efficient use of energy in support of the need to reduce greenhouse emissions.

Basic energy initiatives can also be in support of the increased investment in low-carbon technology, improved energy efficiency and increased use of renewable energy, which are of importance in addressing the climate change and energy access nexus.

Basic energy in this survey therefore does not include macro-scale initiatives such as Cahora Bassa hydro-electric generation, Hwange thermal power generation and production of fossil fuel energy such as petroleum, large-scale *Jatropha* biofuel production, and solar powered macro-scale initiatives. National projects such as rural electrifications fall outside the scope of this report as well as nuclear power and wave energy projects/programmes.

### **1.3 Purpose of the survey**

The purpose of the survey is to provide input to a concept note on possible coordinated approaches to support the development and promotion of improved and more efficient solutions on basic energy and energy access.

### **1.4 Geographical scope**

The survey covered the 15 SADC countries namely Angola, Botswana, the Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. However, not all countries provided information on the survey due to the reasons of data collection limitations as explained below. The main focus areas of the survey were initiatives in the rural areas and peri-urban where access to modern and or high technological energy sources are absent.

### **1.5 Methodology**

#### **Techniques for data collection**

The survey results were collected from a rapid assessment of SADC Member States through a desk study supported with limited enquiries to key stakeholders. The main technique for data collection was Internet searches. This was complimented by email and telephone as well as face-to-face interviews using a standard form. A team of researchers was assigned to collect information from the 15 SADC countries.

#### **Stakeholders contacted**

The survey relied on information collected from websites or representatives of stakeholders including ministries of energy and environment, forestry commissions, power utilities, national institutions responsible for energy access development, non-governmental organizations, research institutions, and international cooperating partners and development banks.

---

<sup>3</sup> Carbon credits to help finance Green House Gas (GHG) reduction projects

**Data collection limitations**

While desk research was used for the survey, it was not sufficient given its limitations particularly in the SADC region where information of this nature is not always readily available either on the Internet or documented for public consumption. As a result, very little information was obtained from some countries while information available on the Internet could not be corroborated with the relevant institutions. This survey was conducted in just over a month, a very limited timeframe considering the range of stakeholders and number of countries that needed to be covered and it was not feasible to do a detailed analysis of results. There was simply not enough time to manoeuvre the bureaucratic hurdles encountered among government-related institutions, to wait for responses nor to conduct field visits as may have been desired. Nonetheless, the information contained herein, while it can be considered work-in-progress, provides useful insights that can guide members of the SADC Energy Thematic Group in coordinating their approaches, and even more important, the output provides a basic framework for a more comprehensive future survey.

## 2. GLOBAL AND REGIONAL CONTEXT

### 2.1 The energy debate

The relationship between energy production and consumption on one hand, and biodiversity and people on the other is quite complex, and scientific knowledge about them is evolving all the time. To date, climate change stands out as the most significant indirect impact on biodiversity resulting from energy production and consumption. However, direct impacts from powerline construction, coal mining and woodfuel extraction continue to degrade habitat and there does not seem to be any signs of relenting, in spite of all the international commitments, regional and national policies.

To combat climate change, there seems to be global consensus on the issue that over-reliance on fossil fuels, unsustainable exploitation of biofuels and inefficient energy conversion methods are at the root of the problem while energy from renewables, more sustainable use of biofuels and energy efficiency and conservation are central to the solution.

As developing nations strive towards better standards of living, one of the biggest developmental questions remains on how to reduce carbon emissions and other environmental degradation while at the same time increasing access to energy for the millions who presently yearn for better access? In SADC, as many as 60% of the population still live in rural areas while a significant population remain confined in slums, the majority of them without access to modern energy sources.

If the biggest energy challenge for developed countries is energy security, developing countries, including those in SADC, are mostly grappling with access to energy particularly for the majority of citizens who remain outside national grids.

It is worth noting that despite the fact that the majority of the population in most SADC Member States live in rural areas, current development priorities in these countries favour investment in fossil fuels and large-scale thermal and hydroelectric plants that feed into the national grid.

Although SADC has put in place programmes and policies aimed at making modern energy services available to the rural and urban poor through for example electrification of public facilities such as schools and clinics in a quest to meet MDGs, traditional biomass remains the predominant source of energy for the cooking and heating needs of the majority of the population. Biomass such as woodfuel, charcoal, agricultural residue and animal dung is the primary source of basic energy for up to 80% of total energy consumption for families and informal businesses particularly among the rural and urban poor.

While the exploitation of biomass is not by itself a cause of concern, it becomes an issue of global concern when natural resources are harvested in an unsustainable manner and when energy conversion technologies remain inefficient, a situation that may lead to serious adverse consequences for health, the environment and economic development (World Energy Outlook, 2006).

The language of energy means different things to different people. For the rich, especially those in developed nations the mere mention of energy brings to the fore fossil fuels such as petroleum products to run cars, natural gas for heating or electricity for lights and computers, and the energy carriers such as the various fuels and electricity or the follow-on services such as lighting, refrigeration, transportation, telecommunications and power to run machinery which are easily accessible, often at affordable prices.

For the majority in the developing world, it is often about basic survival means; energy for cooking and heating. Where modern energy is available, it is often at disproportionately higher prices. Where it is not available, which would be the majority of

cases, millions of people, mostly women and children spend long hours collecting biomass (IUCN, 2007:11).

To improve access to those outside national grids decentralised energy systems where homes and villages, schools and clinics can produce their own power are paramount and the use of existing and emerging technologies can be key in overcoming current energy challenges in SADC, as would be the case in other developing countries.

Globally, examples abound of promising, locally adapted sustainable basic energy production and consumption initiatives. This survey report highlights some of those specific to southern Africa, as well as the sources of funding needed to overcome the energy challenges.

## **2.2 Legal framework of basic energy**

The basic energy initiatives are in line with the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) as enshrined in Article 2(IV)<sup>4</sup> where research on and promotion of basic energy initiatives are encouraged. The Kyoto Protocol was established in 1997 under the UNFCCC (which itself was adopted in 1992). Under the Kyoto Protocol, the developed countries have to undertake two major commitments, that is, to reduce their greenhouse gas emissions, and to provide finance and technology to developing countries.

As part of fulfilling requirements of Article 11<sup>5</sup> of the Kyoto Protocol, International Cooperating Partners from developed countries provide most of the financial requirements for the basic energy initiatives in developing countries. The developed countries are also obliged to provide financial resources and technology transfer to developing countries.

As basic energy initiatives mainly focus on improving livelihoods of the rural and urban poor, the concept is embraced within the SADC Energy Protocol. One of the principles of Article 2 of the protocol encourages Member States to use energy to support economic growth and development, alleviation of poverty and the improvement of the standard and quality of life of the general populace.

According to the protocol, Member States are determined to ensure, through collective action, the progress and well being of the people of the SADC region through the provision and use of energy for people, particularly ensuring that low-income residents have access to energy. Also in line with the protocol which compels Member States to ensure that the development and use of energy takes cognisance of the gender realities of the region, most basic energy initiatives should incorporate gender concerns (SARDC, 2007:5).

## **2.3 Clean Development Mechanism and its link to basic energy**

Some Basic energy initiatives are being developed under the Kyoto Protocol's Article 12 which is on Clean Development Mechanism (CDM), and hence speak to the spirit of the UNFCCC. The CDM is an arrangement under the Kyoto Protocol allowing industrialised

---

<sup>4</sup> Article 2(IV) states that research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies.

<sup>5</sup> Article 11 says developed countries shall provide new and additional financial resources to meet the agreed full costs of developing countries in implementing commitments (for reporting on information) and provide financial resources (including technology transfer) to meet the agreed full incremental costs needed by developing countries to implement their commitments (which include formulating and implementing national/regional programmes for mitigation and adaptation).

countries with a greenhouse gas reduction commitment (called Annex B countries) to invest in projects that reduce emissions in developing countries as an alternative to more expensive emission reductions in their own countries.

The CDM projects provide a large number of small-scale changes to make a large carbon difference. The basic idea is selling energy efficient or renewable energy products to consumers in survival markets that have limited or no access to the grid. Types of projects include commercial domestic products such as energy efficient woodstoves and solar lamps. Though on a slow pace, various CDM projects have already been started in the SADC region. There is still a huge untapped market potential, and with innovative low priced and culturally acceptable products, and the backing of sound carbon-finance, success is certainly possible.<sup>6</sup>

Carbon credits can play an essential role in providing affordable solutions for local communities with limited purchasing power in the rural and peri-urban markets. More than half of the registered CDM projects on the African continent are located in South Africa (RTCC, 2009).

#### **2.4 Forms of basic energy, technologies and initiatives**

The SADC Energy Protocol identifies the following subsectors of energy: woodfuel, petroleum and natural gas, electricity, coal, new and renewable energy sources, energy efficiency and conservation, and other cross cutting themes that are said of interest to Member States (SADC, 1996). It however acknowledges that the list as presently identified is not exclusive nor exhaustive and can be extended in future. In this survey, the same principle is used, that is taking note of the subsectors but without remaining prisoner to it.

Basic energy can be grouped under five platforms, which are biofuels, solar power, hydro-techs, fossil fuel and wind power. Biofuel is defined as solid, liquid or gaseous fuel obtained from relatively recent, lifeless biological material.<sup>7</sup> Globally, biofuels are mostly used to power vehicles and machinery, heating homes and for cooking while in the SADC countries the use is mainly in heating water and tobacco barns, in grinding mills and in cooking.

Biomass, a form of biofuel, still accounts for nearly 80% of the total energy demand in SADC rural population and urban poor. Experts predict that wood use in Africa will double by 2020.<sup>8</sup> Population growth, lack of effective local resource management and a lack of regulation of fuel wood collection have led to over harvesting.

Subsequently there has been an increased rate of desertification. This is not only problematic in terms of the environment, but also in achieving energy security for the lower income groups. The biomass includes firewood, cow dung, slurry, and crop residues. Most of this energy is used for cooking, baking and heating. A substantial amount goes into small-scale businesses such as brick burning.

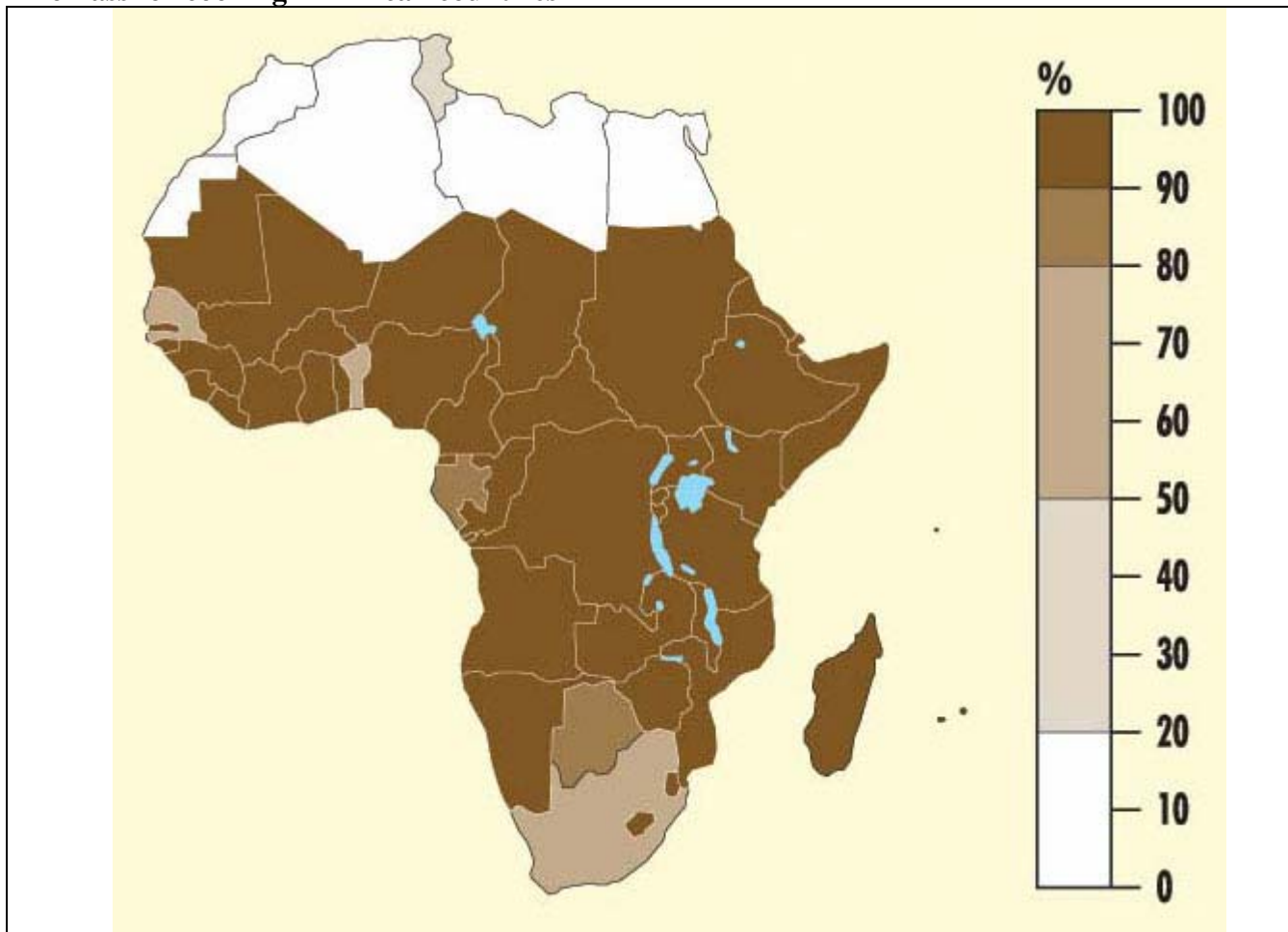
---

<sup>6</sup> Carbon financing refers to carbon credits to help finance GHG reduction projects from [www.onecarbon.com](http://www.onecarbon.com)

<sup>7</sup> from [www.bioenergylists.org](http://www.bioenergylists.org)

<sup>8</sup> from [www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1193009236](http://www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1193009236)

## Biomass for cooking in African countries



Source: World Energy Outlook 2006

Another biofuel produced through the process of anaerobic digestion of organic material by anaerobes is biogas. This can be produced either from biodegradable waste materials or by use of energy crops fed into anaerobic digesters to supplement gas yields (Singh, 2005). The main component of the biogas from such reaction is the methane gas (CH<sub>4</sub>). Domestic biogas can address both sanitation and household energy needs by utilizing the manure produced by domestic animals, as well as, human excreta for producing clean cooking fuel.

Biogas digester consists of one or more airtight reservoirs into which a suitable feedstock is placed, either in batches or by continuous feed. Small-scale digesters for household use are commonly made of concrete, bricks, metal, fibreglass or plastic.

In SADC countries, the biogas can be used for cooking, lighting, heating and as a fuel in specially adapted engines for mechanical and electrical power production. Projects for biogas are also implemented as community based sanitation and wastewater treatment.

Apart from solid and gaseous biofuels, there are also liquid biofuels such as biodiesel. The common source of such fuel is extracted from plants such as *Jatropha*, cotton seed, soy seed, sugar and sunflower and are also known as Straight Vegetable Oils (SVOs) (Jones et al, 2002). The SVOs are a renewable fuel produced locally in rural areas and can be used in unmodified diesel Lister engines with the current available local skills. The use of SVOs reduces Greenhouse Gas (GHG) emissions such as hydrocarbons, carbon monoxide, particulates, soot and other air toxics, and at the same time, they are biodegradable.

The use of gel, another form of biofuel, is widespread in peri-urban areas of southern Africa. Gel fuel is a compound of ethyl alcohol (ethanol) and organic pulp (cellulose). The two are gelatinised with addition of water forming a clear and transparent compound with a gel-like consistency<sup>9</sup>. Gel does not emit toxic gasses when burning. It is often odourless, smokeless and safer when swallowed or inhaled compared to liquid fuels, while also being environmentally friendly and heat efficient.

While SADC countries have so many opportunities for mini-hydro electric generation, the cost of setting up the schemes is very high. Mini-hydropower schemes are usually isolated and not connected to the main grid. The system uses water from the river, thereby avoiding damage to environment and social effects that large hydroelectric schemes cause. These are usually constructed with labour provided by the local people. Besides providing power for practical needs, the mini-hydro schemes are being used for income generating activities such as grain milling in some southern African communities.

Basic energy initiatives also include small-scale conservation technologies for the non-renewable fossil fuels such as coal, and Liquid Petroleum Gas (LPG), which are derived from biological material that has been dead for centuries.

Southern Africa's abundant sun is yet to be tapped to its full potential as most countries are estimated to receive more than 2,500 hours of sunshine per year (SADC-SARDC, 2007:8). Solar power is clean and renewable and the stand-alone solar plants do not require any transmission lines.

There has been an upsurge of solar initiatives in the region since the turn of the millennium. This is mainly due to the free abundant sunshine in the region as well as the fact that products can be stand alones with no connections required. Many of these have been concentrated on solar water heaters, solar cookers, solar dryers, solar lanterns, solar streetlights, and the conversion to electricity using Photovoltaic (PV).

Wind energy is another resource that is yet to be fully exploited in the region. Countries such as Angola, Namibia, Mozambique, South Africa and Tanzania, which have vast stretches of coastline, have a great advantage to exploit the wind and sea waves to generate electricity.

Basic energy initiatives are not only in the actual provision of the energy product but also include provision of services such as research, training, manufacturing and marketing. A range of basic energy initiatives are profiled in subsequent sections of this report.

---

<sup>9</sup> from [www.greengel.co.za/safety.htm](http://www.greengel.co.za/safety.htm)

### 3. EXISTING AND PLANNED PROJECTS/PROGRAMMES

#### 3.1 Regional Projects/Programmes

The programmes or projects may also be global or continental. The initiatives in this section cut across all forms of energy sources that include biofuels, hydroelectricity, fossil fuels, solar and wind energy.

**Title:** African Rural Energy Enterprise Development (AREED)<sup>10</sup>

**Description:** AREED, a United Nations Environment Programme (UNEP) initiative supported by the UN Foundation provides early-stage funding and enterprise development services to entrepreneurs, helping build successful businesses that supply clean energy technologies and services to rural and peri-urban African customers. Its approach involves training and hands-on business development assistance. For the enterprises that show the best commercial potential, AREED also provides early-stage investment and assistance to secure additional finance. AREED works with African NGOs and development organizations, helping them to identify potential energy projects and provide follow-up business support services to entrepreneurs.

**Partners** UN Foundation

**Title:** Biogas for Better Life Africa Initiative

**Description:** Plans are underway to construct two million biogas plants in Africa in the next 10 years with an aim of preserving the environment. The project, which is under the supervision of the Netherlands organization SNV, was formally launched in Nairobi recently, with the support in cash and in kind of about 12 international organisations. SNV will collaborate with the Government of Nepal and the German organization, GTZ, to implement the project, whose ambition is to construct biogas plants right up to the ward level. The first phase of the initiative will take three years, and will need more than 800,000 euro for the construction of biogas plants at the ward level.

**Partners:** SNV, GTZ

**Title:** Clean Energy in Development Cooperation<sup>11</sup>

**Description:** The Norwegian Ministry of Foreign Affairs (MoFA), together with Norad, joined forces to work on the Clean Energy in Development Cooperation. The programme involves rolling out a 4-year plan including all activities funded by Norway in the energy sector. MoFA and Norad recognised that the low level of infrastructure and uneven distribution of resources, particularly in Africa require more attention to regional cooperation and power trade.

**Partners:** The Norwegian Ministry of Foreign Affairs and NORAD

---

<sup>10</sup> [http://www.ared.org/program/index\\_program.htm](http://www.ared.org/program/index_program.htm)

<sup>11</sup> NHO: [http://www.nho.no/files/NBK\\_2007\\_T2\\_Tore\\_Gjoes.doc](http://www.nho.no/files/NBK_2007_T2_Tore_Gjoes.doc)

**Title:** **Energy Sector Management Assistance Programme (ESMAP)<sup>12</sup>**

**Description:** ESMAP is a global technical assistance programme which helps build consensus and provides policy advice on sustainable energy development to governments of developing countries and economies in transition. ESMAP also contributes to the transfer of technology and knowledge in energy sector management and the delivery of modern energy services to the poor. It was established in 1983 in 100 different countries through approximately 750 activities covering a broad range of energy issues.<sup>13</sup>

**Partners:** World Bank, UNDP, Finland's Department for International Development Cooperation (FINNIDA), Australian Agency for International Development, Austria Development Agency, Austria-Federal Ministry for Foreign Affairs, Denmark Ministry of Foreign Affairs, Agence Française de Développement, German Federal Ministry for Economic Development and Cooperation, Iceland Ministry of Foreign Affairs, Norwegian Ministry of Foreign Affairs, The Netherlands Ministry for Development Cooperation, and United Kingdom Department for International Development (DFID).

**Title:** **The EU Energy Initiative (EUEI)**

**Description:** The goal of the EUEI for Poverty Eradication and Sustainable Development is to contribute to providing the access to energy necessary for the achievement of the Millennium Development Goals, particularly, but not exclusively, that of halving the number of people in extreme poverty by the year 2015. The EU proposes to work with developing countries towards creating the necessary conditions in the energy sector to achieve their national economic, social and environmental objectives, in particular by maximising energy efficiency, including more efficient use of fossil fuels and traditional biomass, and increasing the use of renewable energy. The initiative has an ongoing dialogue with other international energy initiatives, such as the Forum of Energy Ministers of Africa (FEMA), the New Partnership for Africa's Development (NEPAD), the Johannesburg Renewable Energy Coalition (JREC), the Global Village Energy Partnership (GVEP), the Global Network on Energy for Sustainable Development (GNESD), the Renewable Energy and Energy Efficiency Partnership (REEEP) and the Global Forum on Energy for Sustainable Development (GFSE). The EU Energy Initiative participates in the energy and development dialogue within the UN Commission for Sustainable Development (CSD) and other global fora. The programme was launched in 2002.<sup>14</sup>

**Partners:** EU and country partners

**Title** **Global Energy Efficiency and Renewable Energy Fund (GEEREF)**

**Description:** GEEREF is aimed at funding renewable energy initiatives in developing countries in sub-Saharan including southern Africa, among other regions. The project was established in 2007 and is ongoing.<sup>15</sup>

**Partners:** Norwegian Ministry of Foreign Affairs<sup>16</sup>, EU

---

<sup>12</sup> ESMAP: <http://www.esmap.org/about/index.asp>

<sup>13</sup> Unlocking the Domestic Private Sector: ESMAP's Energy SME Program provides energy services to the poor. <http://www.esmap.org/themes/ESMAP-EnergySMEs.pdf>

<sup>14</sup> [http://ec.europa.eu/energy/renewables/index\\_en.htm](http://ec.europa.eu/energy/renewables/index_en.htm)

<sup>15</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1939&format=HTML&aged=0&language=en&guiLanguage=en>

**Titles:** **Household Energy Programme**<sup>17</sup>

**Description:** Gesellschaft für Technische Zusammenarbeit (GTZ), on behalf of the German Federal Ministry for Economic Cooperation and Development, runs a global Household Energy for Sustainable Development (HERA) project. The main objective of HERA is to further mainstream sustainable household energy management into relevant projects and programmes to ensure basic energy security for households and small businesses. Basic energy security in the context of HERA covers thermal energy for cooking, baking, heating and productive uses with a special focus on Africa. In southern Africa, HERA has partner projects in Lesotho, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe.

One of the major lessons that GTZ has learnt from its work in promoting household energy is that any participatory approach that also takes gender equity issues into account improves the prospects of technology acceptance<sup>18</sup>. HERA and Energising Africa (EnAf) jointly support countries in southern and eastern Africa in developing national biomass energy strategies (BEST Initiative), and GTZ also supports the ProBEC initiative. Renewable energies sources that GTZ promotes are biomass, hydropower, geothermal, solar energy, and wind power.

**Partners:** GTZ, German Federal Ministry for Economic Cooperation and Development

**Title** **International Solar Energy Society (ISES) projects**

**Description:** Since its founding in 1954, the ISES has been involved in several renewable energy projects and one of its projects in the southern region was way back in 1999. Together with the Development Bank of Southern Africa, the ISES worked on a project to assess the integrated regional potential for the widespread introduction and application of appropriate renewable energy technologies within SADC and produced a report under the European Commission contract. DBSA and ISES recommended the European Commission to be heavily involved in investment in renewable energy technologies in the region.<sup>19</sup> The ISES will, in line with bringing small, medium and large-scale stakeholders in the field of renewable energy discuss energy development issues around the globe, at the ISES Solar World Congress 2009 to be held in Johannesburg, South Africa, from 11 to 14 October 2009. This congress, to be held under the banner, “Renewable Energy: Shaping our Future”<sup>20</sup>, will be hosted by the Sustainable Energy Society of Southern Africa (SESSA) and the Foundation for Professional Development.

**Partners:** EC, DBSA, ISES

---

<sup>16</sup> Norway Ministry of Foreign Affairs:

[http://www.regjeringen.no/en/dep/ud/press/News/2008/energy\\_fund.html?id=538908](http://www.regjeringen.no/en/dep/ud/press/News/2008/energy_fund.html?id=538908)

<sup>17</sup> HERA: <http://www.gtz.de/en/themen/umwelt-infrastruktur/energie/12941.htm>

<sup>18</sup> GTZ's experiences in the field of household energy: <http://www.gtz.de/de/dokumente/en-lessons-learnt-2006.pdf>

<sup>19</sup> The joint DBSA-ISES report (September 1999) is available on the ISES website following the link: <http://www.ises.org/ISES.nsf/f3e5b699aa79d0cfc12568b3002334da/1dc00fec2e880ea8c1256b3a005308b3/PageContent/M2/ISES-DBSA%20report.PDF!OpenElement>

<sup>20</sup> ISES Solar World Congress 2009 website: <http://www.swc2009.co.za/>

**Title**           **Lighting Africa Programme**

**Description:** Lighting Africa is an International Finance Corporation (IFC)-World Bank initiative aimed at providing up to 250 million people in Sub-Saharan Africa with access to non-fossil fuel-based, low cost, safe, and reliable lighting products with associated basic energy services by the year 2030. The programme addresses the lighting needs of mainly low-income households and businesses in rural, urban, and peri-urban areas and advocates for a mixture of on-grid and off-grid solutions. The initiative is central to the World Bank's investment framework for clean energy and development and the Africa energy access scale-up plan.

**Partners:**       IFC-World Bank

**Title:**           **Programme on Basic Energy and Conservation (ProBEC)**

**Description:** ProBEC is a regional programme implemented by the German Agency for Technical Co-operation (GTZ) in the SADC region. The programme manages and stimulates the establishment of various projects based on basic energy conservation in nine member states in SADC. Currently ProBEC is actively involved in Malawi, Lesotho, Mozambique, Tanzania, Swaziland, Zambia, Botswana, Namibia and South Africa. The mission of ProBEC is to promote improved energy solutions through market development and policy support. It focuses on three areas, which are efficient use of energy devices, giving policy advice, and developing new knowledge on biofuel. It trains new stove producers, tests and conducts research into stoves, materials and manufacturing processes. The time frame is from 1998 to 2009.<sup>21</sup>

**Partners:**       GTZ, EU, UNDP, GEF, DGIS, Norway National Advisory Groups (NAGs).

**Title:**           **Regional Biomass Stove Test Centre for the SADC Region at SIRDC**

**Description:** The Energy Technology Institute at the Scientific and Industrial Research and Development Centre (SIRDC) in Zimbabwe was chosen by GTZ ProBEC to be the Southern Africa Regional Test Centre for biomass-stove development and indoor pollution measurements. The institute received laboratory equipment for air pollution measurement and is actively carrying out projects in the region using these facilities. The centre also trains entrepreneurs on the construction and testing of efficient biomass stoves.<sup>22</sup>

**Partners:**       GTZ, SIRDC

**Title:**           **Regional Hydro Catalysing Modern Energy Service Delivery to Marginal Communities in Southern Africa**

**Description:** Practical Action Southern Africa's energy project assists people in making choices on available energy options, enhancing opportunities for income generation and employment creation as well as improving livelihoods. In early 2008, the energy project concentrated on establishing micro hydro energy projects in southern Africa. The main objective is to improve access to modern energy services and increase uptake of renewable energy technologies. The five-year project from 2008-2012, will rehabilitate six existing micro hydro schemes and establish nine new ones, targeting the

---

<sup>21</sup> from <http://www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1192750452>

<sup>22</sup> interview with Mr Mundembe, Director Energy Technological Institute SIRDC

mountainous regions of Manica in Mozambique, Mulanje in Malawi and Manicaland in Zimbabwe. One scheme already established in Manicaland, Zimbabwe provides electricity for Nyafaro High School teachers' quarters and a clinic.<sup>23</sup> Other expected benefits are that grain milling will be carried out using micro hydropower instead of diesel engine-based electricity. Communities will be able to cure tobacco using hydropower rather than biomass, thereby reducing the use of wood resources.<sup>24</sup>

**Partners:** E C, Practical Action Southern Africa

**Title:** SPARKNET Project

**Description:** This is a project, which involves eleven countries, four of which are from the EU, and the rest are from Eastern and Southern Africa. The project aims to develop interactive knowledge network for the household energy users. SIRDC was chosen to be the focal point of the project in Zimbabwe. Other partners include the Council for Scientific and Industrial Research (CSIR) in South Africa, Botswana Technology Centre (BOTEC) in Botswana and the Development Technology Centre in the Faculty of Agriculture at the University of Zimbabwe. SPARKNET is sponsored by the European Commission's 5th Framework Programme for Research under the research and technological development programme "Confirming the International Role of Community Research (INCO)".

**Partners:** EU, SIRDC, CSIR, BOTEC, UZ

## 3.2 National Projects/Programmes

### 3.2.1 Angola

#### Solar Powered Initiatives

**Title:** Solar Panel Project Paranhos

**Description:** In June 2004, BP Solar and the British government established a renewable energy source for the 360 people living in Paranhos. A free-standing solar panel installation was established, and ever since, the solar panels have been providing the village with clean, renewable solar energy to help power community facilities such as the local school, medical facility, water-pumping facility, and vaccine refrigerator. According to a report appearing on the Solar Panel Information (SPI) website, Angola's Ministry of Energy and Water is exploring the feasibility of using the Paranhos project's use of solar panels as a model for the rest of the country.<sup>25</sup>

**Partners:** Governments of Angola and Britain

#### Wind Power

**Title:** Plans to Produce Wind Power

**Description:** Partnerships were identified in areas of renewable energy, especially on wind power sector, between Netherlands and the Angolan Government. Both

---

<sup>23</sup> Interview with Mr Lasten Mika, Practical Action Southern Africa

<sup>24</sup> <http://practicalaction.org/?id=Regional%20Hydro>

<sup>25</sup> <http://www.solarpanelinfo.com/solarprojects/bp-solar-paranhos.php>

countries will establish technical contacts and carry out studies on evaluation of plots and quality of raw materials, so that financing strategies for the materialization of projects are outlined. The potential cooperation will see 100 percent of urban areas, 60% of peri-urban regions and 30% of rural areas being covered at the end of the project in 2012<sup>26</sup>.

**Partners:** The Netherlands, Government of Angola

### 3.2.2 Botswana

#### **Biofuel Initiatives**

**Title:** **Baseline Study on Kitchen Management in Botswana**

**Description:** ProBEC in cooperation with Rural Electrification Botswana commissioned Biofuels Botswana to conduct a study in 2008 on kitchen management and energy saving techniques. Results of the study indicated promising levels of acceptance for some products particularly the Rocket stove and the Lesotho hot bag. This project seeks to engage in further preparatory activities prior to the launch of a full-scale programme of work in Botswana by ProBEC. The selected villages included Dikwididi, Oodi, Mmopani, Metsimothlabe and Mononyane<sup>27</sup>. The study concluded that in spite of the high level of awareness further analysis and observation led to the conclusion that 50% of the respondents did not practice the energy saving techniques and cooking habits and hence there is need for reinforcing the importance of using these techniques amongst the villagers through awareness campaigns.

**Partners:** Biofuels Botswana, GTZ, GEF/UNDP

**Title** **Rural Electrification Project**

**Description:** Rural Electrification (RE) Botswana seeks to improve access to modern and clean energy services for rural Botswana. RE Botswana is establishing a rural energy service franchise through which private sector operators will deliver a range of lighting and cooking products. These include rechargeable lanterns, solar PV systems, improved wood stoves, solar cookers and heat retention devices. Various sizes, configurations and packages will be offered for households, enterprises and government facilities. Depending on the item, these products will either be retailed to customers or offered on a fee-for-service basis.

**Partners:** GEF, UNDP, Government of Botswana

### 3.2.3 Democratic Republic of Congo

#### **Biofuels**

**Title:** **Fuel-efficient Stoves to Reduce Firewood Harvesting in Mountain Gorilla Habitat**

**Description:** The project is a low-cost high-impact project benefiting the gorillas and their habitat as well as the local human population. The overall objective of the project is to reduce reliance on the resources of the Virunga National Park through the production and distribution of fuel-efficient stoves in North Kivu

---

<sup>26</sup> Angola to produce wind power. Angola Press, 04 April 2009.

[http://www.portalangop.co.ao/motix/en\\_us/noticias/economia/Angola-produce-wind-power.4477daea-cdfe-4b11-bea1-18f8305619e5.html](http://www.portalangop.co.ao/motix/en_us/noticias/economia/Angola-produce-wind-power.4477daea-cdfe-4b11-bea1-18f8305619e5.html)

<sup>27</sup> from <http://www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1192918356>

Province of DRC. The specific objectives are: to produce and distribute a minimum of 1,000 fuel-efficient stoves; to improve health by reducing the volume of harmful smoke produced by stoves; and to increase community awareness of the consequences of deforestation and the need to conserve DRC's forests. The project, which is run by the Gorilla Organisation, began in January 2008. During 2009 the project is set to produce a further 500 - 1,000 stoves and will continue all sensitisation activities<sup>28</sup>.

**Partners:** The Gorilla Organisation

### 3.2.4 Lesotho

#### **Biofuel initiatives**

**Title:** Carbon Trading project

**Description:** A seven-year agreement has been brokered by ProBEC that will see the roll out of an efficient wood stove project earning finance on the international carbon trading market. Climate Care Trust Ltd, a financial institution entered into a partnership with ProBEC to lay the foundation for the implementation of a carbon trading mechanism within biomass conservation efforts. The carbon-financed project will stimulate efficient cooking stove dissemination. The initiative aims to minimise wood fuel gas emissions and has Lesotho-based Technology for Economic Development (TED) as the implementing agent, while Pioneer Carbon Ltd (PCL), a UK-registered private-sector company, will handle the carbon verification process and ensure that the procedures for obtaining carbon credits are followed.

**Partners:** GTZ, JP Climate Care, TED, Pioneer Carbon (Ltd)

**Title:** Community Based Sanitation and Decentralised Wastewater Treatment Systems (CBS-DEWATS) – Biogas plant

**Description:** In co-operation with Technologies for Economic Development (TED) of Lesotho and Bremen Overseas Research and Development Association (BORDA) from Germany, the Department of Water and Sanitation in Developing Countries at the Swiss Federal Institute for Environmental Science and Technology, in Switzerland is conducting a research on the Biogas DEWATS plants in Maseru.<sup>29</sup> The objective of this study is to get more information about the performance of the DEWATS systems of TED-BORDA. The monitoring of operating DEWATS-systems shall give reliable data regarding the gas production as well as the suitability of the plant when getting fed with kitchen wastes or animal dung. Results of gas production can also be used when estimating the potential of CDM or other similar voluntary solutions. The team would like to expand the project to focus on peri-urban low-income areas within 6 SADC countries Botswana, Lesotho, Namibia, Tanzania, Zambia and Zimbabwe.

**Partners:** BORDA, Department of Water and Sanitation in Developing Countries at the Swiss Federal Institute for Environmental Science and Technology and TED

---

<sup>28</sup> <http://gorilla.wildlifedirect.org/2009/03/26/year-of-the-gorilla-project-fuel-efficient-stoves-to-save-mountain-gorillas/>

<sup>29</sup> ([www.sandec.ch](http://www.sandec.ch))

**Title: Efficient Institutional Cook Stove (EICS) project**

**Description:** ProBEC in collaboration with TED and JP Climate Care, started a project in 2008 involving installation of 500 institutional cook stoves with roofed shelters in selected rural schools in Lesotho under the World Food Programme (WFP) feeding programme. The purpose is to improve the efficiency of cooking in the selected schools, reduce the biomass consumed and GHG emissions. WFP is responsible for identifying installation sites, transportation of material and people. ProBEC and TED are responsible for project management, training stove producers and assisting in design and installation as well as monitoring of required data and information. JP Morgan Climate Care (Pioneer Carbon) is responsible for providing finance for labour and materials and facilitates the verification of emissions reductions. There are plans to develop the EICS project into a programmatic model that can be duplicated in other parts of SADC. The immediate intention so far is to duplicate the project in Swaziland for the feeding of orphans. Training of local entrepreneurs in the production of such products is done. ProBEC in conjunction with the Ministry of Minerals and Energy, trained locals in 2008 and 96 Lion stoves have been constructed at participating schools.<sup>30</sup> A proposal has also been submitted to GEF small grants to fund Household Efficient Stoves for some villages in the Mokhotlong and Qacha's Nek districts and Lesotho Foothills stoves are being tested.

**Partners:** JP Morgan Climate Care, GTZ, GEF

**Mini hydro initiatives**

**Title: Rural Electrification Project**

**Description:** In February 2009, the African Development Bank, (AfDB) approved a rural electrification project covering the Mphaki, Hlotse, Maseru central and Mantsonyane areas of Lesotho. One of the main objectives of this project is to refurbish a mini hydro plant that will generate additional 2 MW power to reduce power outages in the country during peak time. In addition, supply and installation of 350 solar home systems are also envisaged for households situated far away from the electricity grid. The UNDP pilot procedure will be used that comprises of a selection criteria requiring a beneficiary to be at least 5km away from the grid and willing to pay at least 40% of the cost of the project, while the government subsidises 60% of the cost. The project's implementation is earmarked for February 2010.<sup>31</sup>

**Partners:** AfDB, Government of Lesotho

**Solar Initiatives**

**Title: Solar Electricity Lighting in Rural Clinics<sup>32</sup>**

**Description:** The Solar Electricity Light Fund (SELF) is partnering the Partners in Health (PIH) in an effort to electrify a network of 10 community health clinics using solar energy. SELF plans to use the hybrid solar PV/diesel generator system, which will provide 90 percent solar power, with diesel generators for back up during prolonged heavy usage, or in periods of rain. This project started in

---

<sup>30</sup> Review and improvement of data related to wood products in Lesotho  
<http://www.fao.org/docrep/003/X6756E/X6756E00.HTM>

<sup>31</sup> AfDB: <http://www.afdb.org/en/projects-operations/project-portfolio/project/rural-electrification-project-818/>

<sup>32</sup> <http://www.self.org/lesotho1.shtml>

2007. This “solar for health” partnership between SELF and PIH is aimed at providing basic health care services to the people in rural Lesotho. SELF draws much of its experiences from the successful implementation of projects in rural South Africa where it has been solar electrifying rural schools in KwaZulu Natal. In Lesotho, the project has completed the electrification of four of the 10 clinics as of March 2008. SELF now seeks to raise funds for the next six sites.

**Partners:** Solar Electricity Light Fund, PIH

### 3.2.5 Madagascar

#### **Biofuels**

**Title:** **Integrated Carbon Credit Programs: A Biofuels Program that Links the Energy, Land Use and Transportation Sectors**

**Description:** An interdisciplinary team of University of Michigan faculty and students will develop a replicable approach for securing carbon credits in order to support the creation of integrated biofuels projects in developing countries. The team will focus on how carbon credit mechanisms can be used in Africa by applying an analysis to the case of the Fianarantsoa-Côte Est (FCE) railway transport corridor in Madagascar. The FCE railway sustains a lively informal economy for the roughly 100,000 rural people living along its route. Currently, international investors are considering options to revitalize the railway and encourage adjacent communities to diversify their agricultural base by growing *Jatropha curcas* for oil extraction. The energy-rich oil seed would be used as feedstock for the production of bio diesel sold to the railway itself and regional state-run electrical power plants. The project, which started in August 2008 will run up to August 2009<sup>33</sup>.

**Partners:** University of Michigan

**Title:** **Renewable Energy and Energy Efficiency Promotion in International Co-operation (REPIC) Platform**

**Description:** REPIC Platform is a joint initiative of the Swiss State Secretariat for Economic Affairs (SECO), Swiss Agency for Development and Cooperation (SDC), Federation Office for the Environment (FOEN) and Swiss Federal Office of Energy. REPIC Platform has been implementing wind, solar thermal and mini-hydro energy projects in Madagascar. In addition to the wind energy projects (the ongoing 15 Villages Pilot Wind Region Diego-Suarez 1st Phase<sup>34</sup> and the completed Mad'Eole, Industrial Centre for Wind Energy in the Indian Ocean), REPIC is currently working with a Swiss NGO, the Centre Ecologique Albert Schweitzer, in an ongoing project titled “Technical training program for Madagascan craftspersons in the renewable energy sector” with a main focus on small hydropower and solar thermal<sup>35</sup>.

**Partners:** SECO, SDC, FOEN

---

<sup>33</sup> <http://epa.gov/ncer/>

<sup>34</sup> [http://www.repic.ch/main/Show\\$Id=1267.html](http://www.repic.ch/main/Show$Id=1267.html)

<sup>35</sup> [http://www.repic.ch/main/Show\\$Id=1268.html](http://www.repic.ch/main/Show$Id=1268.html)

### **Mini-hydro initiatives**

**Title:** **Technical training programme for Madagascan craftspersons in the renewable energy sector Madagascar**

**Description:** The Centre Ecologique Albert Schweitzer, Neuchâtel, Daniel Schneider (CEAS) offers technical training in Small hydropower and Solar power generations. As the ultimate objective the programme aims at improving the living conditions for Madagascan craftspersons. CEAS develops and brings to market several technologies for the use of renewable energies and with the help of its international network has already trained six Madagascans in these technologies. Simultaneously, Madagascan partners of CEAS have been instructed in the maintenance of PICO hydropower turbines, which are produced by the French-Swiss company AZ Ingénierie and which have been newly introduced in Madagascar. Within the programme, this know-how shall now be broadened and strengthened on one hand through the creation of a pilot workshop, which shall assure the continuing training of the craftspersons, and on the other hand, through an active participation in the further development of the PICO turbines in Madagascar. The training involves testing, recording of technical problems and inspection of the already installed turbines.<sup>36</sup> The program is ongoing.

**Partners:** French-Swiss company AZ Ingénierie

### **Solar Powered initiatives**

**Title:** **ADES solar projects<sup>37</sup>**

**Description:** Association pour le Développement de l'Énergie Solaire Suisse-Madagascar (ADES) has innovated a Box Solar Cooker that can generate temperatures up to 150°C which is sufficient to cook almost all meals and can also be used to sterilise medical tools or water. In a project that started in 2001, ADES oversees the production, construction and sales of solar cookers by local craftsmen in the ADES factory in Tuléar in the south of Madagascar. ADES then sells them to the population at an affordable price, and by end of 2005, 1,300 solar cookers had been sold. ADES also trains the population on how to use the solar cooker. Other outputs include solar dehydrators and parabolic-solar cookers. In order to cover the whole south of Madagascar, ADES is planning to build various regional and local centres for solar cooking within the next 8 to 10 years.

**Partners:** Development Intervention Fund (FID)<sup>38</sup>, an organisation financed by the Government of Madagascar and the World Bank

**Title:** **UV Water Treatment Powered by Solar Energy<sup>39</sup>**

**Description:** A French NGO, "1001 Fontaines pour demain" wants to introduce in Madagascar an ultraviolet water treatment powered by solar energy for small rural isolated communities (villages, schools, health care dispensaries) to independently produce the drinkable water they need, using surface water. PRACTICA Foundation of the Netherlands was contracted in 2006 by 1001 Fontaines pour demain to conduct a feasibility study in north east Madagascar

---

<sup>36</sup> [www.ceas.ch](http://www.ceas.ch)

<sup>37</sup> ADES: <http://www.adesolaire.org/en/worumEsGeht.html>

<sup>38</sup> FID: <http://www.fid.mg/accueil.php?lg=en>

<sup>39</sup> PRACTICA Foundation: <http://www.practicafoundation.nl/projects/projects-in-africa/madagascar-uv-water-treatment/>

at a cost of €3400, and following positive recommendations from PRACTICA, the two organisations worked on a project plan for implementation by a national NGO, Frères de Saint Gabriel, in four sites, Analamaotra, Fenoarivo, Mahavelona and Vavatenina. The first phase started in 2008, and depending on its lessons, Phase 2 will cover more sites.

**Partners:** Development Intervention Fund (FID)<sup>40</sup>, an organisation financed by the Government of Madagascar and the World Bank, 1001 Fontaines pour demain

#### **Wind energy initiatives**

**Title:** Villages Pilot Wind Region Diego-Suarez (Madagascar), 1st Phase<sup>41</sup>

**Description:** Switzerland's The Renewable Energy and Energy Efficiency Promotion in International Co-operation (REPIC Platform), in partnership with Förderverein Mad'Eole Schweiz, is implementing a wind energy electrification project in rural Madagascar. 15 villages are targeted for the electrification project. The REPIC project seeks to use wind energy as the primary energy source with diesel generators as a back-up. The goal of the project is reduction of the migration into cities through local income generation due to the electrification and the strengthening of social structure in the village communities. Simultaneously, the know-how in the existing institutions (advanced technical college, technical university, industry and trade) shall be strengthened and broadened.

**Partners:** Switzerland and Government of Madagascar

### **3.2.6 Malawi**

**Title:** Biomass projects

**Description:** The projects can be summarised as the promotion of clay stoves in rural areas and the training of stove producers as well as partner organisations and village-based trainers; training metal workers to become institutional rocket stove producers; research and marketing activities to provide an enabling environment for producers; identifying employers with a large staff base so as to encourage the use of efficient, fixed household rocket stoves such as the Esperanza and Changu stoves; encouraging the development of energy devices that are appropriate for productive use by small and medium enterprises that involve the burning of wood, including the promotion of efficient tobacco rocket barns; and research and development on the second and third generation products.

**Partners:** Government of Malawi, DGIS, Concern Universal Dedza and Ntcheu programmes, GOAL Malawi, Ripple Africa, Lujeri Tea Estates, Total Landcare, Emmanuel International, EU Income Generating Public Works Programme, CPAR Malawi, CADECOM and others.

#### **Solar Initiatives**

**Title:** Lighting Malawian Homes project<sup>42</sup>

**Description:** SolarAid has a project running in Malawi called the Lighting Malawian Homes project. The project was carried out after the realisation that poor communities in Malawi use kerosene for lighting, which is highly toxic. As a

<sup>40</sup> FID: <http://www.fid.mg/accueil.php?lg=en>

<sup>41</sup> REPIC: [http://www.replic.ch/main/Show\\$Id=1267.html](http://www.replic.ch/main/Show$Id=1267.html)

<sup>42</sup> <http://solar-aid.org/projects/health/lighting-malawian-homes.html#more>

result, the Lighting Malawian Homes project seeks to introduce clean, locally-assembled affordable solar lighting and electricity into rural homes by local solar entrepreneurs at a project cost of £65,000. SolarAid is doing this project in partnership with the Textile Recycling for Aid and International Development (TRAID), a UK registered charity. Although the project is in its early stages, with the support of TRAID, SolarAid has already successfully trained a group of young people affected by HIV and AIDS who have gone on to form a solar business called KASSOB. According to TRAID's website<sup>43</sup>, KASSOB has sold over 40 products to their local community to date.

**Partners:** SolarAid, TRAID

### 3.2.7 Mauritius

#### **Waste to Energy Initiatives**

**Title:** Waste to Energy initiative in Mauritius

**Description:** In a joint venture involving government of Mauritius, a local company and an American firm, plans are to invest US\$200 million in a project to set up a "Waste to Energy" plant in the west of the country. The project aims to dispose of 300,000 tonnes of refuse collected by municipal councils through incineration to produce 20 megawatts (MW) of electricity which will be sold to the local power utility, the Central Electricity Board. Construction of the plant was scheduled to start in mid-2007 and will be operational by end of 2009.<sup>44</sup>

**Partners:** Government of Mauritius

#### **Wind Energy Initiative**

**Title:** Wind Park at Bigara Project in Mauritius<sup>45</sup>

**Description:** Bigara is found in the central high plateau of Mauritius and is at least 600m above sea level providing a good site for wind energy potential. The land area is also quite vast, providing ample space for the wind park. It is expected that a wind park of 25-40 MW could be developed at Bigara. This is substantiated from a study carried out by Batelle Pacific Northwest Laboratories under a UNDTCD funded project entitled "Wind Energy Resource Assessment for Mauritius".

**Partners:** UNDTCD

### 3.2.8 Mozambique

**Title:** Energy Reform and Access Programme (ERAP)<sup>46</sup>

**Description:** ERAP is an ongoing project that started in January 2005 with the objective of increasing access to modern energy through capital investment by the government of Mozambique, donors and Private Sector Participation (PSP). The programme, through reform and capacity building, also seeks to create an

---

<sup>43</sup> <http://www.traid.org.uk/sa.html>

<sup>44</sup> [www.gov.mu/portal/goc/menv/files/recycling.doc](http://www.gov.mu/portal/goc/menv/files/recycling.doc)

<sup>45</sup> <http://www.gov.mu/portal/goc/mpu/file/Background.pdf>

<sup>46</sup> AfDB: <http://www.afdb.org/en/projects-operations/project-portfolio/project/energy-reform-and-access-program-erap-364/>

enabling environment to promote PSP in the energy sector. The programme's beneficiaries are mainly the rural households, and to a smaller extent peri-urban households who do not have access to electricity. A Renewable Energy Promotion Component will provide solar PV power to 300 schools and health facilities, and 2,500 households and small businesses.

**Partners:** ADF, Government of Mozambique, AfDB

**Title:** **The Sustainable Energy Activities in Local Areas of Sofala (SEALAS)**<sup>47</sup>

**Description:** The objective of the SEALAS project is to strengthen capacity building of the civil society organizations, so that they are ready to identify and implement renewable energy activities. In addition the implementation of demonstration projects, networking with other actors, and energy policy work are supported. As a result of the implementation of this project, the poorest local groups in Sofala province have gained access to more sustainable energy solutions. The project began in 2004, and a second phase is planned for start in 2010. Central to the project is the establishment of two local energy and development centres that are administered by people from the local communities. The centres are managed by a local energy committees that also make use of sustainable energy in the development of the local area. People are able to get free information on energy solutions, and at the same time the energy centres function as training and meeting places for local NGOs. The centres have energy shops where people can buy small windmills, solar cells, charcoal stoves and bottled gas.

**Partners:** Danish Organisation for Renewable Energy (OVE)

### **Biofuels**

**Title:** **Biomass Projects**

**Description:** ProBEC is promoting initiatives including the POCA ceramic charcoal stove; the fixed mud stove (Poupa Lenha fixo); the portable clay stove (Poupa Lenha movel); the Mangi-Mangi or institutional portable stove; the institutional rocket stove (fixed) and ovens for bakeries. The POCA stove is manufactured by Ceramic Arte in Maputo. These interventions are based in the provinces of Maputo, Manica and Sofala. In October 2008, six institutional Lion stoves were built in Cadeia civil (a prison) in Maputo to support the feeding programme for the prisoners. A proposal for co-operation to build institutional stoves between ProBEC<sup>48</sup> and World Vision in the northern provinces of Nampula, Tete and Zambezia has been submitted to World Vision.

**Partners:** Agência de Desenvolvimento Econômico Local (ADEL) in Sofala, Agências de Desenvolvimento Econômico Local de Moçambique (ADEM) and Organismo de Desenvolvimento Economico Local (Kulima) in Maputo. Technoserve - a United States NGO based in Maputo, GTZ.

**Title:** **Liquid Biofuel Opportunity Study**

**Description:** ProBEC is supporting the implementation of a biofuel project in collaboration with TechnoServe. The project will conduct a scoping exercise on bio oil opportunities in Mozambique. This study will conceptualise small-scale projects of local biofuel production aimed at the local community so that they

---

<sup>47</sup> OVE, Denmark. [http://www.ove.org/index.php?la=eng&id=67&p=2&rel\\_id=67](http://www.ove.org/index.php?la=eng&id=67&p=2&rel_id=67)

<sup>48</sup> [www.probec.org](http://www.probec.org)

are able to use bio oil for their energy needs. One is a small-scale pilot project where it works with a farmer's organisation, COFAMOSA – to integrate sustainability criteria into its business plan. The aim is for COFAMOSA to apply sustainability standards in its implementation. ProBEC plans to support the growing of sugar crops such as sugar cane, sugar beet, sweet sorghum, or starch such as maize, and then use yeast fermentation to produce ethanol-ethyl alcohol. It also plans to grow plants that produce oils naturally such as soy bean, oil palm and *Jatropha*.

**Partners:** TechnoServe, GTZ

### **Solar Initiatives**

**Title:** **Solar systems in Mozambique FUNAE**

**Description:** Mozambique's Energy Fund (FUNAE) plans to install 2,500 solar powered systems by the end of June 2009 in Inhambane and Sofala provinces<sup>49</sup> as part of the project for electrification of rural areas. The World Bank Group initiative "Lightning Africa" could offer relevant guidance since it emphasizes market catalyzing actions rather than give-aways. Norway embassy in Maputo supports provision of stand alone lighting packages for key public facilities such as schools and clinics and administrative posts, e.g. through the use of solar panels, and solar PV systems.

**Partners:** World Bank, Norway Ministry of Foreign Affairs, FUNAE

### **3.2.9 Namibia**

**Title:** **Namibia Renewable Energies Programme (NAMREP)**

**Description:** Namibia has embraced the solar drive with various solar water heating and solar lighting projects running. The government launched its five-year Namibia Renewable Energies Programme (NAMREP) in 2007 aiming at providing solar water heating systems and panels for use by rural households living off the grid<sup>50</sup>.

**Partners:** GEF (UNDP).

**Title:** **Renewable Energy and Energy Efficiency Institute (REEEI)**

**Description:** REEEI is a joint venture initiative between the Polytechnic of Namibia and the Ministry of Mines and Energy. Its mandate is to collect and disseminate information on renewable energy and energy efficiency technologies and practices. Currently REEEI is running a DANIDA funded Renewable Energy and Energy Efficiency Capacity Building Programme (REEECAP), whose objective is to increase the use of renewable energy and energy efficiency measures to promote environmentally sustainable socio-economic development of Namibia. In the same spirit, REEEI is working closely with manufacturers of efficient Tsotso stoves, solar cookers, and, wood gasifiers to promote these and other technologies.

**Partners:** DANIDA, Government of Namibia

---

<sup>49</sup> FUNAE projects to install 2500 solar systems. Jornal Noticias, 25th of January 2007.  
<http://www.mozlink.co.mz/en/content/pdf/2391>

<sup>50</sup> Rays of hope. SADC Today, Vo.9 No.6 February 2007.  
<http://www.sardc.net/editorial/sadctoday/documents/v9n6.pdf>

**Title:** Biomass Energy Savings Project (NAMBESP).

**Description:** Women dominate in training and operations of the stove production centre in the NAMBESP. Both men and women make suggestions for improvements in the stoves. ProBEC has only just begun activities in Namibia. Initial activities involve identifying needs and planning the programme. Thus far, a national advisory group has been created. ProBEC's intervention in Namibia, supports the government's five-year Namibia Renewable Energies Programme launched in 2007.

**Partners:** GTZ, Government of Namibia

### **Solar Initiatives**

**Title:** Solar cell phone charging shops

**Description:** In late 2006, the Desert Research Foundation of Namibia (DRFN) started by investigating the feasibility of solar cell phone charging shops as an approach towards establishing energy shops in Namibia. Two shops located in Windhoek's informal settlement, Havana, have been closely monitored and mentored. A solar cell phone charging system comprises 10 charging sockets and two lights. The charging system is capable of charging about 20 cell phones per day and provides daily electricity for 3 hours for each light (replacing the need for candle, paraffin or gas). The system is versatile and can accommodate any type of cell phone DC charger. The cell phone charging system is powered by one small solar panel, which is easily removed at night and stored safely.

**Partners:** DFRN

### **Wind Energy Initiatives**

**Title:** Wind Generation in Walvis Bay

**Description:** The objectives of the project were to implement a pilot, grid connected, wind generator at Mile 7 substation near Walvis Bay and build local capacity in management and planning of wind turbine implementation. The project is replicable in other countries taking guidance from the lessons learnt. These include prior in-depth assessment of refurbished wind turbines (if applicable), capacity to operate pilot plants which have no economies of scale, risk mitigation for the local contracting parties, obligatory information sharing between international and local partner companies and allowing for a realistic implementation time frame.<sup>51</sup>

**Partners:** DANIDA

**Title:** Wind Energy Power Plant

**Description:** In an effort to promote new and renewable sources of energy in Namibia, the Ministry of Mines and Energy in conjunction with NamPower have investigated the possibility of constructing a Wind Power Plant. The suitable location of these types of industrial installation would be best appropriate along the coastal line of the country. The findings were submitted to the Ministry of Mines and Energy for approval. The feasibility study was commissioned in 1999 and completed in 2000, and indicated that between

---

<sup>51</sup> [www.nampower.com.na/docs/media/Appendix%206B%20%20Minutes%20of%20Second%20Public%20Meeting%2024](http://www.nampower.com.na/docs/media/Appendix%206B%20%20Minutes%20of%20Second%20Public%20Meeting%2024)

5MW to 10MW Wind Power generation can be supported and constructed given the statistics of the wind potentiality in the area of Lüderitz. The Spanish Company Eldecnor has teamed up with NamPower to construct the plant.

**Partners:** NamPower, The Spanish Company Eldecnor

### 3.2.10 Seychelles

**Title:** **Renewable Energy Project in the Marine Park Authority in Seychelles**

**Description:** In the Curieuse Island, Seychelles, the United Nations and the Energy Affairs Division of Seychelles embarked on a project to harness solar power. The project involved installing solar PV and solar water heaters in Marine Parks. The project was completed in 2005 and was financed by the Italian Government. Solar power is still being provided in the Marine Park.<sup>52</sup>

**Partners:** Seychelles and Italian Governments

#### **Wind Energy Initiatives**

**Title:** **Wind Power On Mahe Seychelles**

**Description:** Masdar, Abu Dhabi's multi-faceted future energy initiative wholly owned by the Mubadala Development Company, and the Seychelles government announced on 20 January 2009 a collaborative agreement to develop renewable energy in the Seychelles. Preliminary studies have indicated that wind energy, solar energy and waste-to-energy options will be able to supply the pristine island of Mahé with clean, renewable power. Under this collaborative agreement, it is expected that feasibility studies and the required environmental impact assessments will be undertaken to determine the positioning of wind turbines in several locations around Mahé Island. An initial target of 18 megawatts of electricity generated from wind power is envisaged, which could initially supply at least 10-15 percent of Mahé Island's total energy demand, offsetting the need for expensive imports of traditional diesel and heavy fuel oil. Emission reductions resulting from the project will be monetized under the Clean Development Mechanism (CDM) framework of the Kyoto Protocol as Certified Emission Reduction (CER) credits.

**Partners:** Mubadala Development Company, and the Seychelles Government

### 3.2.11 South Africa

**Title:** **South Africa's National Energy Research Institute (SANERI) Projects**

**Description:** South Africa's National Energy Research Institute, SANERI has renewable and alternative energy projects, which fall under the basic energy initiatives. SANERI is the public entity entrusted with the coordination and undertaking of public interest energy research, development and demonstration. The institute is a relatively new body, established by the then Minister of Minerals and Energy in October 2004, as a subsidiary of CEF (Pty) Ltd, the state energy company in South Africa. The projects include: New cultivators of triticale, and an alternative raw material for ethanol production. The

---

<sup>52</sup> <http://www.sidsnet.org/successtories/34.html>

University of Stellenbosch is implementing this project and a Prototype pyrolysis process for the production of biofuels from indigenous energy crops.

**Partners:** CEF, SANERI

**Title:** **Renewable Energy Solutions for Off-Grid Guest Houses and Farms**

**Description:** Nollie se Kloof is a guest farm in the Ceres district, which is not connected to the national electricity grid. In December 2005 the owner has installed a hybrid renewable electricity supply system comprising: a 1000W micro hydro turbine; 720W photo voltaic array and a 1000W wind turbine in a 36V system. A battery bank stores the electric energy. The system is sufficient to supply the guesthouse that accommodates 16 people with the following electric equipment: electric kettle, fridge, freezer, microwave, TV, HiFi and various lights. The main aim of the project was to establish the amount of electric power which each renewable source (wind, solar PV and micro hydro) delivers; the technical viability of each renewable solution for this specific location; and to identify any methods to improve the system. A nearby water stream has been harnessed using a small hydro turbine (Stream Engine – 1000W). The advantage of this turbine is that it operates continuously while there is sufficient flow. A set of three similar Stream Engines has been running on a guest lodge at De Vlucht located on the Prince Alfred Pass between Uniondale and Knysna. These turbines have been running for about seven years without replacing the bearings or any other major maintenance<sup>53</sup>.

**Partners:** Privately funded by the owner, Nollie se Kloof.

#### **Biofuel Initiatives**

**Title:** **Biomass projects**

**Description:** ProBEC's strategic partner in South Africa is the Central Energy Fund (CEF) and all activities are structured to support CEF's mandate in the energy sector, with specific focus on the household sector. It aims to acquire a range of producers and partnerships that will optimise effectiveness in both capacity building and energy efficiency approaches. One such partnership is with Association for Renewable Energy Cooking Appliances (AFRECA).

**Partners:** GTZ, CEF, AFRECA

**Title:** **PetroSA Biogas to Energy Project in South Africa**

**Description:** The project is the first Independent Power Producer in South Africa to use the Clean Development Mechanism under the Kyoto Protocol and is a 4.2 MW biogas to electricity plant located in Mossel Bay at the state owned gas-to-liquids refinery PetroSA. The main objective of the project is to generate non-fossil fuelled electricity thus leading to a reduction in CO<sub>2</sub> emissions in South Africa. A further objective is to create a poverty alleviation mechanism in the Eden municipality and this aim is being achieved by paying an annual 7.5% royalty to a poverty alleviation fund for the development of sustainable social projects. The programme is managed by a NGO Ikamva Labantu<sup>54</sup>. The project started in 2006 and is ongoing.

**Partners:** MethCap, CEF, Ikamva Labantu and NRG Investments, PetroSA.

---

<sup>53</sup> /www.sun.ac.za/crses

<sup>54</sup> http://www.reeep.org

**Title: Cradock Sugar Beet Ethanol Project in South Africa**

**Description:** The location for this venture is Cradock in the Eastern Cape, where the Industrial Development Corporation (IDC) teamed up with other companies, among them Sugar Beet South Africa (SBRSA). A sugar refinery was envisaged in the Fish River Valley, but in 2007 it was announced that sugar beet would be used to make ethanol for biofuel. A joint venture was formed between the IDC, the Central Energy Fund and SBRSA. A site for the plant was recently bought right across the Great Fish River from Lingelihle township, about 4km from the centre of Cradock.

**Partners:** CEF, IDC

**Title: Community Energy Shop, Based on Community Energy Needs and Requirements**

**Description:** This project was implemented by Welanga Consulting (WC), a non-government organization in South Africa. The second phase of the project ran from July 2004 to December 2008. The project sought to establish a Community Energy Shop in the Maphephetheni Tribal Authority meant to increase community access, and reduce financial and other barriers to sustainable energy sources. The project reported that the national non-grid electrification programme is battling with implementation and this approach of involving Community Energy Centres could provide a long-lasting solution to ensuring sustainable access to energy in rural areas.<sup>55</sup>

**Partners:** GEF SGP

**Fossil Fuelled Initiatives**

**Title: Basa njengo Magogo (MnM) - Improved use of Coal initiative in South Africa**

**Description:** CEF (Pty) Ltd is promoting the Basa njengo Magogo (BnM) initiative. This is a low-smoke fire lighting method that entails placing a few lumps of coal on the top of a fire at the right time, thereby improving ignition of the underlying coals. “Basa njengo Magogo” is a Zulu phrase meaning, “Make your fire like the old lady”. With the BnM there is less smoke emission and improved air quality. The respiratory hazards associated with indoor air pollution are minimised. Following initial pilot studies and experimentation with its uptake, the BnM method has finally come of age for mass roll out, and CEF has been mandated by the Department of Minerals and Energy (DME) to manage the roll out.

**Partners:** CEF, DME

**Solar Initiatives**

**Title: Brightening Lives with Solar Schools**

**Description:** Solar Electricity Light Fund (SELF) is promoting the solar electrification of schools in South Africa building up on the successes of its earlier projects in KwaZulu-Natal where it began the solar electrification of Myeka High School in 1996. Basing on this firm foundation, SELF electrified three schools in the Eastern Cape region of South Africa with funding from the Kellogg

---

<sup>55</sup> GEF Small Grant Programme: <http://sgp.undp.org/index.cfm>

Foundation and JP Morgan Chase in 2008<sup>56</sup>. SELF was working with its local partners such as eKhaya ICT and Telecom Techniques where Internet connectivity was also enabled through a solar-powered WiFi mesh network. SELF also wants to expand its Solar Schools Project to provide two KwaZulu-Natal high schools with lighting, TVs and VCRs, computer labs of 25-30 workstations, Internet access and other technical resources, all powered by solar energy.

**Partners:** SELF, Kellogg Foundation, JP Morgan

**Title:** **Kuyasa Low Cost Housing Energy Upgrade Project, Khayelitsha,**

**Description:** The project is a retrofit activity which entails the installation of solar water heaters, ceilings and ceiling insulation and compact fluorescent light bulbs (CFLs) in existing Reconstruction and Development Programme houses in Kuyasa, Khayelitsha, Cape Town. The proponent is the City of Cape Town Metropolitan Local Authority. The project is largely funded with public money, with a percentage coming from CDM carbon revenue. The objective of the project is to alleviate energy poverty by providing the poor with access to renewable, and energy efficient technologies. The target audience includes households, as well as local authorities and housing departments.

**Partners:** City of Cape Town Metropolitan Local Authority.

**Title:** **Solar Water Heaters in Lwandle Hostels Project**

**Description:** The objective of the project was to achieve the lowest cost option for the delivery of warm water and including a pay-as-you-use metering, backup to the solar and to secure the balance of financing required. A second objective of the project was to achieve sustainability in the receptivity of water heating technologies through active involvement in the economic and financial analyses of options leading to selection and through that ownership.

**Partners:** The Government of South Africa

**Title:** **Sustainable Energy for Environment and Development (SEED)**

**Description:** The Sustainable Energy for Environment and Development (SEED) Programme in South Africa reckons that Solar Water Heaters (SWH) have a considerable potential to leverage electricity savings, increase employment opportunities, decrease electricity demand and reduce greenhouse gas emissions, the latter showing one of the integral benefits that renewable energy has in the fight against the global environmental challenge – climate change (SEED, 2007). SEED also reports that the City of Johannesburg, through its utility, City Power, has partnered with BEKA (Pty) Ltd to install twenty Solar Street Lights at the informal township of Zandspruit in the northern suburbs of Johannesburg. According to the SEED report, “this energy source will be beneficial to improving the quality of life of these communities, especially in areas where the conventional form of energy is non-existent or its installation is geographically and environmentally problematic.”<sup>57</sup> BEKA’s solar programme consists of street, area and security lighting, and these projects are concentrated mainly in the Johannesburg area.

---

<sup>56</sup> <http://www.self.org/southafrica2.shtml>

<sup>57</sup> *ibid*

Its solar street lighting installation can operate at high light output for over 12 to 14 hour periods.<sup>58</sup>

**Partners:** City Power, BEKA (Pty) Ltd

**Title:** SETSOLAR

**Description:** Another initiative in the country involves SETSOLAR, reported to be the only black South African women-owned solar panel manufacturer in South Africa. According to a report from the Cape Business News<sup>59</sup> in South Africa, Wesgro, the official Investment and Trade Promotion Agency for the Western Cape, facilitated a five-year R40million investment into SETSOLAR. SETSOLAR's activities are concentrated on the manufacture of photovoltaic solar modules for stand-alone and non grid systems and it also plans to venture into other forms of energy such as wind and bio-energy<sup>60</sup>. The company also targets export markets across SADC.

**Partners:** SETSOLAR

### **Wind Energy Initiatives**

**Title:** Darling Wind Farm Project

**Description:** Cape Town approved a proposed power purchase agreement with Darling Wind Farm, a R70m (approx. US\$11m) national pilot project funded jointly by the Danish International Development Agency, the Department of Minerals and Energy, and the Darling Independent Power Producing Company. The project will open up opportunities for further wind energy projects and other "green energy projects" in the Western Cape and the rest of southern Africa. Under the project, Cape Town residents will purchase energy from the Darling Wind Farm. This will be marketed to "willing buyers" at an initial premium of R0.25 per kwh. Apart from the Darling Farm and ESKOM's Klipheuwel wind energy initiatives, wind energy is still under-utilised in South Africa<sup>61</sup>. This is regardless of the potential of the country's coastal regions to produce energy from this abundant resource.

**Partners:** ESKOM, Government of South Africa, DANIDA

## **3.2.12 Swaziland**

### **Biofuel Initiative**

**Title:** Efficient Institutional Cook Stove (EICS) project

**Description:** ProBEC has the intention to duplicate the Lesotho EICS project in Swaziland for the feeding of orphans. The purpose is to improve the efficiency of cooking in the selected schools, reduce the biomass consumed and GHG emissions. WFP is responsible for identifying installation sites, transportation of material and people. ProBEC is responsible for project management, training stove producers and assisting in design and installation as well as monitoring of required data and information.

**Partners:** GTZ, WFP

---

<sup>58</sup> <http://www.beka.co.za/node/43>

<sup>59</sup> Cape Business News (20 August 2008). [Solar Panels Light the Way.](http://www.cbn.co.za/dailynews/3113.html)  
<http://www.cbn.co.za/dailynews/3113.html>

<sup>60</sup> <http://www.setsolar.co.za>

<sup>61</sup> Darling: Generating electricity from thin air. The Energy Journal, Iss.1. January 2009.  
<http://www.cef.org.za/pdf/Energy%20Journal%202009.pdf>

### 3.2.13 Tanzania

#### **Biofuel Initiatives**

**Title:** African Rural Energy Enterprises Development (AREED) Phase II

**Description:** AREED is a United Nations Environment Programme (UNEP) initiative designed in the year 2000 to help alleviate energy poverty in Tanzania and Zambia. AREED II, a three-year programme, from 2008 to 2010 is a follow-up to AREED Phase I. The objective is to improve access to renewable, clean and reliable energy systems to remote population through an enterprise-centred approach. Priority is much more on enterprise of biofuels, energy efficiency, and solar crop drying and renewable power irrigation technologies; Emphasis is on social enterprises with investments below USD50,000; seed loan support; end user finance component (TaTEDO 2008.18).

**Partners:** SIDA, UNEP, Tanzania Traditional Energy Development and Environment Organisation (TaTEDO).

**Title:** Biomass Projects

**Description:** The project activities include the promotion of: clay stoves in rural areas through NGOs; fixed household rocket stoves in staff houses of large employers; improved cook stoves for contract farmers and employees; large scale cook stoves for canteens in social institutions and companies; efficient biomass consuming devices for SMEs; and further research and development. It is envisaged that ProBEC's local partner, Association of Tanzania Tobacco Traders (ATTT), will support 60 farmers to field test the new barn concept. ProBEC is in collaboration with the Ministry of Energy and Minerals, Zanzibar Department of Energy, and Commission for Science and Technology in Tanzania in dissemination of technologies<sup>62</sup>.

**Partners:** GTZ, Government of Tanzania, Private partners including Uniliver Tea Company, Mufindi Tea Company, Kibena Tea Company, Wakulima Tea Company, Tanzania Wattle Company LTD, ATTT, Tabora and West Usambara Women Education.

**Title:** New Low-cost Biogas Initiative

**Description:** The new biogas technology, popularly known as VACVINA, has been introduced in Tanzania from Vietnam through Tanzania Traditional Energy Development and Environment Organisation (TaTEDO). Two biogas experts from Vietnam conducted a technical training, which included both theory and practical sessions of constructing low cost biogas plant. A total number of 17 trainees, from Kilimanjaro, Tanga, Coast and Dar es Salaam, participated in the training, which took place for a period of one month at the TaTEDO Sustainable Energy and Development Centre (SEDC)<sup>63</sup>. During the training, two biogas plants were built. The introduction of the new biogas technology has been facilitated by partnership programme called Enabling Access to Sustainable Energy (EASE).

**Partners:** HIVOS, TaTEDO

---

<sup>62</sup> <http://www.tanzania.go.tz/>; [www.probec.org](http://www.probec.org) Tanzania's activities in 2008

<sup>63</sup> TaTEDO Sustainable Energy and Development forum Issue no 6. June 2008

**Title: Plant Oil Stove Project in Arusha**

**Description:** The plant oil stove (POS) of Bosch and Siemens Household Appliances Group (BSH) is a new technology in Africa. It was introduced to Tanzania to establish if plant oil could be a new energy carrier for domestic cooking. The initiative entailed a field test, implemented as a Public-Private Partnership financed by BSH and the German Government. The objective of the field test was to establish whether POS is convenient for various target groups, and whether it can be produced in Tanzania. The project time frame was from 2005-2007. The field test established that POS is not competitive with firewood and charcoal in rural and urban areas. With limited number of upper- to middle-class households, it competes with liquid petroleum gas and electricity. It was also found undesirable due to its high maintenance requirements and the noisiness of its operation. As a result, it is not feasible to go with POS into mass market production and promotion in Tanzania as conditions are not favourable.

**Partners:** BSH and the German Government

**Title: Liquid Biofuel: Decentralized Rural Electrification through Liquid Biofuel Powered Multifunctional Platforms (MFPs) in Tanzania**

**Description:** Tanzania Traditional Energy Development and Environment Organisation (TaTEDO) promotes Multifunctional Platforms (MFPs) for production of electricity from liquid biofuels. The objectives of this pilot project were to install Multifunctional Platforms (MFPs) with associated machineries to transfer skills and demonstrate their technical and business viability in providing modern energy services in Tanzania for oil seed extraction, grain milling, de-husking and battery charging. Also since the MFP run on the locally available *Jatropha* oil, farmers have been sensitised to cultivate *Jatropha* as a way of fuelling MFPs and income generation.<sup>64</sup> From the project a total of 110 households and business have been connected with electricity from the village's mini-grid; more than 5000 villagers are accessing, battery charging, grain milling, and grain de-husking and oil seed pressing services; more than 30 businesses have emerged, benefiting from the access to electricity and motive power from the Multifunctional Platform (MFPs) systems.

**Partners:** EU

**Title: Developing Modern Energy Activities in Rukwa Region**

**Description:** The Tanzania Traditional Energy Development and Environment Organisation (TaTEDO) in collaboration with district and municipal councils, NGOs, FBOs, CBOs and interested individuals performed capacity building activities in villages called Laela, Mtibwa, Matai, Kisumba and others in Sumbawanga municipality. The capacity building activities implemented include trainings on how to bake using TaTEDO ovens, construction of Okoa improved woodfuel stoves, and sustainable charcoal production practices using improved charcoal production methods, multipurpose energy tree growing. The total of 156 target groups (artisans, charcoal producers, baking

---

<sup>64</sup> <http://www.tatedo.org/se.html>

groups, private tree nurseries, were taught as entrepreneurs and trainers for disseminating the knowledge to other stakeholders.<sup>65</sup>

**Partners:** TaTEDO and CBOs.

**Title:** **Households Efficient Stone or Brick Made Woodstoves in Rombo and Hai Districts, Tanzania- A Voluntary market Initiative**

**Description:** The Tanzania Traditional Energy Development and Environment Organisation (TaTEDO) is implementing a project for reducing climate change through voluntary offset market on improved firewood saving stoves in rural areas of Kilimanjaro region. The project intends to replace the three-stone fire places (with efficiency of 10 to 15%) by improved and efficient fire wood stoves (with efficiency of more than 60%).<sup>66</sup> The aim of this project is to construct 6,000 improved woodfuel saving stoves in the 10 villages of Rombo and Hai districts. The villages to be involved are Shimbi Kati, Maharo, Kitasha, Mengwe, and Mamsera for Rombo district and Nronga, Kisereni, Mkuu sinde, Uduru and Mkweseko for Hai district. The project will run for three years from 2008.

**Partners:** HIVOS, TaTEDO

**Titles:** **Training on Improved Charcoal Production at Lubungo Village – Morogoro Region,**

**Description:** TaTEDO conducted training on sustainable charcoal production methods at Lubungo Village in Morogoro District. A total of 21 charcoal producers and five trainer-of-trainers participated in the training programme. Two kilns were constructed, one traditional kiln and another Improved Basic Earthmound Kiln (IBEK). Both kilns had equal volumes of six cubic metres. The results showed that traditional kiln produced seven bags of charcoal while the improved kiln produced 12 bags of charcoal (TATEDO 2009:8).

**Partners:** HIVOS, TaTEDO

#### **Fossil fuelled Initiative**

**Title:** **The Hurricane Lamps Project in Tanzania**

**Description:** This is a product development and marketing project that aims to introduce a new product that will help to create more jobs and increase incomes for micro enterprises. The project has developed a low-cost hurricane lamp that uses paraffin, and its associated tooling system for the micro enterprise sector. The benefits of the low-cost hurricane lamp include that: it is easy to manufacture and uses local skills; it is cheaper than the traditional lamp; it produces more light than the brand that is currently on the market; and it is easier to operate. Currently, five micro enterprises are producing the design of the lantern using the tooling system that the programme designed.

**Partners:** Practical Action East Africa

#### **Mini hydro Initiatives**

**Title:** **Micro-Hydro TaTEDO**

---

<sup>65</sup> <http://www.tatedo.org/news/rukwa.htm>

<sup>66</sup> <http://www.tatedo.org/news/stoves.htm>

**Description:** TaTEDO has identified more than 40 potential sites for micro hydro electricity production in Tanzania. Out of 40 sites, one site has been developed. This site is located at Kinko village, Lushoto District in Tanga region. The village is electrified by a 10KW micro-hydro plant, which was possible through a joint project implemented with UNIDO. Another site, Zege, also in Lushoto, has been surveyed and feasibility study conducted for possible development of micro-hydro project.

**Partners:** UNIDO, TaTEDO

#### **Solar Initiatives**

**Title:** **Battery and Solar Power Services Marketing Centre (BSPSC) in Tanzania Marketing Strategies**

**Description:** The BSPSC is developing Solar PV market through awareness creation to the community through village meetings, distribution of brochures, and other written information regarding the enterprise activities and price list of solar PV systems. Through marketing, the centre has reached customers in three regions, Arusha, Kilimanjaro and Manyara and managed to install Solar PV systems to individuals, private institutions, schools, clinics and religious institutions. The company has already installed more than 800 solar PV systems with capacity of up to 11,500W. Among the installed systems include: 9,200W for households in Kilimanjaro, Arusha and Manyara Regions; 2300W for government and religious institutions in Kilimanjaro, Arusha and Manyara Regions; and 16 square metres (sqm) of water heating collector systems.

**Partners:** BSPSC, TaTEDO, SACCOS

**Title:** **Rural Energy Agency**

**Description:** The United Republic of Tanzania has been planning to exploit the solar resources. The African Rural Energy Enterprise Development (AREED)<sup>67</sup> claims that many Tanzanians are not connected to the national grid and that the widening of electricity access will lessen the burden on the country's forests from being cut for wood fuel. A response to this situation has been a target on alternative sources of energy such as solar, as witnessed by Rural Energy Agency (REA) promoting a prospective Solar PV Project for Schools and Health Facilities. This project is planned for implementation in five districts of Kigoma Rural, Kasulu, Kibondo (Kigoma Region) and Tunduru and Namtumbo (Ruvuma Region) where a total of 173 rural facilities (78 secondary schools, 67 dispensaries, 26 health centres, and two hospitals) will be covered at a total estimated cost of US\$18 million. However, REA is still looking for partners and funds to facilitate the implementation of this project. REA is a body within Tanzania's Ministry of Energy and Minerals.

**Partners:** Government of Tanzania

**Title:** **Market Development of solar dryers and its products for poverty reduction in Ukerewe District**

**Description:** The project was implemented by TaTEDO, from 2005 to 2007.<sup>68</sup> The main objective was to promote and disseminate solar drying technology and its products through awareness creation, training, developing local commercial

---

<sup>67</sup> AREED. <http://www.areed.org/country/tanzania/tanzania.pdf>

<sup>68</sup> GEF Small Grant Programme: <http://sgp.undp.org/index.cfm>

markets and creating synergies with other stakeholders in the solar drying industry.

**Partners:** GEF, TaTEDO

**Title:** **Solar Phone Multicharger, solar Dryers and Solar Lanterns**

**Description:** With support from TaTEDO, Solar phone multi-chargers, solar dryers and solar lanterns are being produced in various parts of Tanzania. Solar phone multi-chargers enable people to charge cellular phones and create possibilities for income generation in the off-grid areas. Solar phone multi-chargers businesses have been tested in Monduli in Arusha Region and Kisarawe and Chanika districts in Coast Region. Solar drying technology is one of the ways for preserving food and stimulates income-generating activities. Through this technology, the organization conducts demonstrations and trainings on solar drying technology to entrepreneurs and provides them with support through provision of relevant information on solar drying technology and assist in market development. Solar lanterns are used as a direct substitution for portable kerosene lantern. Lanterns come with a solar PV charger, for each unit or as a charging station. A fully charged lantern can be used for at least 5 hours continuously.

**Partners:** HIVOs, TaTEDO

**Title:** **Solar for Children (Tanzania)**

**Description:** The majority of Tanzanians live off the grid and hydropower supply is strained. The solution requires an exploration of renewable sources of energy that will cater for those off the grid. This project aims to install 300W systems in 100 schools over four years. This will give pupils and teachers access to the Internet, as well as lighting for evening study and extracurricular activities. SolarAid believes that a reliable electricity supply will help increase literacy, school attendance and teacher retention. The project also recognises the urgent need to train poor people in rural Tanzania, to build solar-powered radios, mobiles and lamps.<sup>69</sup>

**Partners:** SolarAid

**Title:** **Transformation of the Rural Photovoltaic (PV) Market**

**Description:** The project implemented by United Nations Development Programme aims at reducing Tanzania's energy-related CO<sub>2</sub> emissions by introducing photovoltaics (PV) as a substitute for fossil fuel (kerosene) utilized for lighting in the rural areas. It is also aimed at slowing down the rate of additional diesel-based captive generation or grid extension schemes for providing basic electricity services to the un-electrified rural households, specifically in the Mwanza region. In addition, the project will substantially decrease the growing number of rural poor, adults and children alike, who contract respiratory and eye problems due to prolonged exposure to kerosene smoke and soot. The Solar PV will meet the basic electricity needs of individual households in terms of lighting, power for a radio-cassette/TV and of community users such as clinics and schools, initially in Mwanza region, but eventually in the whole country. The project commenced in 2008 .

**Partners:** GEF, Dutch Government, SIDA and UNDP.

---

<sup>69</sup><http://solar-aid.org/projects/education/solar-for-children.html#more>

### **Wind energy Initiatives**

**Title:** **Wind Energy potential study in Tanzania**

**Description:** The Royal Danish Embassy commissioned a study carried out by Tanzania's Traditional Energy Development and Environment Organization (TaTEDO) which found out that there are 15 potential meteorological stations in the country which promise possible wind turbine installations. TaTEDO also reported that wind energy has been used in Tanzania for over 40 years mainly for water pumping<sup>70</sup>. Lessons learnt from the study were that: One of the barriers to the installation of windmills for water pumping and wind turbines in Tanzania is the lack of reliable wind data. Prior to initiating wind energy projects, the local wind regimes should be well known. For this reason, recent and reliable wind data are a pre-requisite. Currently available and accessible wind data in Tanzania are old data collected between the 1930s and 1970s. Although recent data are gathered by the Meteorological Department of Tanzania, these are unprocessed data. It is also not easily possible for third parties to get insight in the data.

**Partners:** The Royal Danish Embassy, TaTEDO

**Title:** **Consolidation of Nyabange Wind Powered Irrigation Project, Musoma**

**Description:** This project was aimed at consolidating the promotion of wide use of wind energy in irrigation farming through support to a demonstration community based irrigation scheme. It was implemented by a Community-Based Organisation, Muungano, Jitihada, Imani – MJI, from June 2005 to December 2006 at a cost of US\$5,904.<sup>71</sup>

**Partners:** GEF through its Small Grants Programme (SGP)

### **3.2.14 Zambia**

#### **Biofuels**

**Title:** **Biodiesel Enterprises Steba Project**

**Description:** Steba Enterprise in Zambia is developing a biodiesel initiative using Moringa feedstock and *Jatropha* as source of oil. The Enterprise started in 2005 by encouraging plantations of *Jatropha* and Moringa and establishes and manages batch biodiesel plants. Steba Biodiesel Enterprises seeks to reduce the cost of high-grade biodiesel fuel through the development and production of low cost *Jatropha* plants and co-locate the biodiesel production facility with the blending terminal. It will also develop an efficient and effective marketing and distribution network, using preferred relationships with the country's fuel distributors and potential biodiesel customers. Steba Enterprise invites joint ventures from Europe, USA, Asia and within Africa to raise funds for the production of this renewable energy source. The enterprises will also be engaged in *Jatropha* biodiesel research and development and offering necessary training to stakeholders and clients.

**Partners:** Steba Enterprise

---

<sup>70</sup> TaTEDO. Wind Energy Study.

<http://www.tatedo.org/publications/research%20and%20studies/wind%20study.pdf>

<sup>71</sup> GEF Small Grant Programme: <http://sgp.undp.org/index.cfm>

**Title: Tobacco Barns and Charcoal Stove Projects**

**Description:** ProBEC, with support from Alliance 1 Company, has constructed nine new rocket barns in the Southern province of Zambia and also conducted user training. ProBEC Zambia has forged a new partnership with the Tobacco Association of Zambia, and it is hoped that this will boost the promotion and implementation of tobacco barns in the country. Alliance 1 Company will consider financing 200 rocket barns in the 2009/2010 farming season (ProBEC 2009). Other activities are that ProBEC Zambia has continued with training of another two producer groups consisting of 13 youths in the town of Kabwe to make Pulumusa household charcoal stoves.

**Partners:** GTZ, Alliance 1 Company, Tobacco Association of Zambia

**Mini Hydro Initiatives**

**Title: Mutanda Mini-Hydro Power Generation/Distribution**

**Description:** Technology Development and Advisory Unit (TDAU) in cooperation with Mutanda Evangelical Centre developed a mini-hydro power along Mapunga River. The main purpose of the project was to provide motorised food processing through the mill and to supply water. However, because of the design of the turbine, whereby all the equipment is connected on the same shaft, the scope of the use of the electricity was widened. The Mutanda Mini-hydro power generation project was to use the water from the Mapunga River, the same river initially diverted into a canal to drive the 2.50kW generator which is enough to light an average of three electric bulbs in each homestead. All the 82 homesteads in the community have access to the generated electricity. Funding was provided by Evangelische Zentralstelle für Entwicklungshilfe (EZE), a German church organisation. One of the lessons learnt is that it is important to utilise appropriate technology for rural communities and ensure that technology transfer ensures project sustainability. TDAU has never been called to go to Mutanda to repair the plant, since the local people attend to all the faults. Thus real technology transfer took place between TDAU and the Mutanda community.

**Partners:** TDAU, EZE

**Solar Initiatives**

**Title: Zambia Community Centres**

**Description:** In Zambia, SolarAid intends to install solar PV systems in 100 schools, clinics and community centres across Zambia enabling people to have access to clean renewable energy. The Zambia Community Centres project will also provide training that will enable people to start solar businesses, which assemble and sell small solar chargers, which can power radios, mobile phones and lamps. Successful trainees will receive business planning and marketing support that will help them set up self sustaining, income generating solar enterprises. The microsolar products will be marketed and sold to rural populations. Solar powered goods will benefit customers by saving on the costs of buying kerosene and batteries.<sup>72</sup>

**Partners:** SolarAid

---

<sup>72</sup> <http://solar-aid.org/projects/livelihood/zambia-community-centres.html#more>

### **Wind Energy Initiative**

**Title: Windmill suppliers in Zambia**

**Description:** Wind generates electricity and can be used directly, as in water pumping applications, and stored in batteries for household use when needed. Wind generators can be used in isolation, or they may be used as part of a hybrid system, in which case their output is combined with that of photovoltaics, and/or a fossil fuel generator. Hybrid systems are especially useful as a power backup for home systems where cloudy weather and windy conditions occur simultaneously. The source of windmill suppliers in Zambia is Zamcapitol limited, a private company based in Lusaka.

**Partners:** Zamcapitol Limited

### **3.2.15 Zimbabwe**

#### **Biofuel Initiatives**

**Title; Biomass Projects**

**Description:** ProBEC started operations in Zimbabwe in 1999 with the Hurungwe pilot project, commencing with a baseline study that was completed in 2000. Since then a number of technologies have been introduced including mud stoves, known as Jengeta Huni stoves, and this culminated in the selection of the fixed-one-pot stove as the most feasible technology to promote. This has subsequently been modified to include two pots. ProBEC also conducts annual demonstrations of products at different events and shows. A total of 2668 portable and 193 fixed stoves were made and sold in 2007 in the two districts of Chimanimani and Gwanda. The trained portable stove producers in Chimanimani have managed to produce and sell 732 stoves between August and the end of October 2007. Institutional stoves have been constructed and distributed to mainly boarding schools around the country<sup>73</sup>.

**Partners:** GTZ, Ministry of Energy and Power Development, and Forestry Commission.

**Title: Electricity from Cogeneration in Zimbabwe**

**Description:** Co-generation, the simultaneous production of electricity and process heat has a potential in improving the energy supply base in the country. There are plants in the country at Triangle and Hippo Valley Estates, which are producing over 70MW electricity in total from biomass (bagasse) for own use as well as feeding into the grid. There is potential to upgrade, through efficiency improvements of these plants to enable them to produce more electricity. A lot of potential however also exists from other sources such as other agricultural waste and forestry residues. The sawmill residue is a nuisance and an environmental hazard to the timber processing companies while the residues, which are left to rot in the plantations, are a waste of energy and a hazard as well should the forest have a fire accident. Yet the forestry waste presents a resource, which could be transformed into electricity using cogeneration, both for own use and for export to the grid<sup>74</sup>.

**Partners:** Government of Zimbabwe, Triangle Ltd, Hippo Valley Ltd

---

<sup>73</sup> Interview with Joylyn Tahwa ProBEC Harare country office and from [www.probec.org](http://www.probec.org)

<sup>74</sup> Interview with Mr Tirivanhu Ministry of Energy Power and Development Zimbabwe

**Title: Biogas for Resettled People Project**

**Description:** The Ministry of Energy has built biogas plants as demonstration projects at institutions, communities and exhibition centres; others are also in use on commercial farms. It is envisaged that biogas will play a major role in providing an alternative source of energy in smallholder farming areas, commercial farms, boarding schools and similar rural institutions for cooking and lighting and a few communities use it for refrigeration. Currently the country has more than 400 biogas digesters scattered countrywide. Focus is on smallholder farmers and newly resettled areas. Constraints in the dissemination of the technology are to do with lack of end-user financing, limited number of trained builders compared to the demand for digesters.

**Partners:** UNDP, EU through Practical Action Southern Africa, Zimbabwe Environment Resources Organisation (ZERO).

**Title: Dutch Stove Project in Masvingo**

**Description:** The Kushinga Bakery, a bread making project, operating in Masvingo City, 293km south of Harare, has opened an opportunity for financial access to five disabled women. Since its establishment in September 2008, the project has been baking bread in a brick and mud moulded Dutch stove and has to date been baking 20 loaves of bread per day from the stove (GENEZ 2009).

**Partners:** Zimbabwe Women Bureau initially funded the project.

**Title: Tubular Biogas Digester Project**

**Description:** Environment Africa, a NGO, has chosen the Energy Technology Institute at SIRDC in Zimbabwe to develop, build and train the rural communities at Kezi Community Centre, South of Zimbabwe, on tubular biogas digesters. The institute completed the installation of a total of four digesters and ran a training course to the community.

**Partners:** Environment Africa, Government of Zimbabwe.

**Title: Gel biofuel stoves and lamps in Zimbabwe**

**Description:** The Ministry of Energy and Power Development in collaboration with Scientific and Industrial Research Development Centre (SIRDC) are promoting green gel stoves in urban and rural households. The gel is a compound of ethyl alcohol (ethanol) and organic pulp (cellulose) and therefore a biofuel. Farmers are being encouraged to diversify into energy crops that produce ethanol. The gel is used for cooking and lighting. Local companies Monach and Treggers are manufacturing the gel cooker stoves. The gel is now being preferred as it burns twice as long as other liquid fuels such as the traditional paraffin. The stoves have also a longer life span than the paraffin stoves. The gel lamp burns for up to 60 hours per 500ml in a standard gel lamp and it burns as brightly as the light of two candles.<sup>75</sup>

**Partners:** Government of Zimbabwe, SIRDC

**Title: Zimbabwe National Training Workshop for Energy Project Practitioners**

**Description:** A training workshop for Energy project practitioners in Zimbabwe was expected on 27 April to 1 May 2009, at Great Zimbabwe Masvingo under the Gender and Energy Network Zimbabwe. The training under the theme

---

<sup>75</sup> Interview with Mr Kamutero Energy Technology Institute (ETI) SIRDC, Zimbabwe

Mainstreaming Gender Concerns into Energy Projects is organised by Practical Action Southern Africa, the National Focal Point for the Gender and Energy Network of Zimbabwe (GENEZ). This will be the second gender and energy training workshop that the national network has implemented, the first one having been held in January 2007. This training workshop is part of the Capacity Building Strategy of the ENERGIA Africa Network of Gender and Energy that GENEZ is a member of. The training aims to strengthen the capacity for project developers and managers to mainstream gender into the design and implementation of energy projects.

**Partners:** ENERGIA, GENEZ, Practical Action Southern Africa

### **Mini-hydropower Initiatives**

**Title:** **Eastern Highlands Mini-hydropower projects**

**Description:** In Zimbabwe particularly in the Eastern Highlands, feasibility studies that have been carried out show that there are a number of perennial rivers with sufficient capacity that can be tapped for mini-hydro power development. Potential also exists at many irrigation dams throughout Zimbabwe to develop small-scale hydroelectric projects to partially offset the energy importation requirements of the country. To date only 7 hydropower generation schemes have been constructed in the eastern highlands, with power output ranging from 8kW to 700kW. These include Gairezi, Manyuchi, Mutirikwi, Osborne, Siya and Tsanga. The ministry is also working on the development of a National Strategy/Master plan on small hydropower development that would bring development in the sector. The constraints can be mainly attributed to the lack of investment in development of mini hydro projects as well as current electricity tariffs. Government policy is that all new dams constructed should have been designed in such a way as to allow mini-hydro power generation.

**Partners:** Government of Zimbabwe

**Title:** **Proposed Mini-hydro in Chipendeke Community<sup>76</sup>**

**Description:** In Chipendeke, the proposed mini-hydro scheme will draw its water resources from the Mwenezi river. This initiative has the potential of generating power from its falling waters that can be used to provide power to the community and the service centre. Practical Action Southern Africa is carrying out technical studies with a view to providing this community with its own decentralized power system. The project's main objective is to improve access to modern energy services and increase uptake of renewable energy technologies.

**Partners:** EU through Practical Action in Southern Africa.

### **Solar Initiatives**

**Title:** **Chimanimani Sustainable Renewable Energy Village**

**Description:** Under this project, the Energy Technology Institute has successfully completed the provision of the Rusitu Valley Community with an integrated and total energy solution to meet their needs for energy. This included the installation of a solar central charging station for lighting the homes and a clinic, provision of solar driers for drying the moisture excess in fruits and

---

<sup>76</sup> Interview with Mr Tirivanhu Ministry Of Energy Power and Development

vegetables and selling it off-season to fetch higher prices. The project, funded by Edit Trust, a regional non-governmental organisation, and Practical Action, was completed in 2006. Challenges, especially vandalism, have been encountered. However, efforts are being made to solicit funds for similar projects elsewhere.

**Partners:** Edit Trust, Practical Action

**Title:** **Chivi Tiri Tose Solar Water Pumping System**

**Description:** A World Vision-funded project is earmarked for implementation in Chivi District, Masvingo province. The solar powered pumping system will pump water from the well for mainly household use and small community market gardening. Construction of tanks is already underway. The project started in 2007 and is expected to end in December 2009.

**Partners:** World Vision

**Title:** **Solar Energy Technologies in Zimbabwe**

**Description:** There have been major investments in the solar energy sector in rural Zimbabwe. Programmes include the Global Environmental Facility (GEF), which ran from 1993 to 1998 and the Japanese International Co-operation Agency (JICA) programme. Both programmes promoted the dissemination of solar home systems with the latter being completed in 2003. Another PV project saw the electrification of 510 rural institutions under funding from the Italian Government. 110 solar water heaters were also installed at a Police Camp in Harare under a Chinese-funded Solar Water Heater Project. Other types of solar applications such as drying of vegetables and fruit, pasteurisation of liquid foodstuffs, water desalination, cooking and water heating are also common. The limiting factor to the adoption of solar energy technologies is the high up-front investment costs required.<sup>77</sup>

**Partners:** JICA, GEF, Italy, China, Government of Zimbabwe

**Title:** **Sustainable Management of Renewable Energy Resources in Rusitu Valley, Chimanimani District (Rusitu Valley Development Trust)**

**Description:** Another project that is running in Zimbabwe with a renewable energy focus is being implemented in the Manicaland province of the country. The project facilitated by the Global Environment Facility's Small Grants Programme (GEF SGP) falls under the Facility's climate change focal area. The goal of the project is "achieving climate change mitigation by reducing the green house gas emissions and improving the living conditions of communities in Rusitu Valley through the provision of clean and affordable sources of energy"<sup>78</sup>. This will be achieved through increasing the access to energy services by households through the development of central solar charging, use of solar power in the homes, solar drying of vegetables, and use of wood saving stoves in the Rusitu Valley. Kellogg Foundation has financially supported the revolving fund. The project, which started in April 2007, is expected to run until December 2009.

**Partners:** GEF, Kellogg Foundation

---

<sup>77</sup> Interview with Mr Tirivanhu Ministry of Energy, Power and Development Zimbabwe

<sup>78</sup> GEF SGP:

[http://sgp.undp.org/web/projects/11193/sustainable\\_management\\_of\\_renewable\\_energy\\_resources\\_in\\_rusitu\\_valley\\_chimanimani\\_district.html](http://sgp.undp.org/web/projects/11193/sustainable_management_of_renewable_energy_resources_in_rusitu_valley_chimanimani_district.html)

**Title: SIRDC Solar Projects**

**Description:** Through its Energy Technology Institute, the Scientific and Industrial Research and Development Centre (SIRDC) has designed, fabricated and installed a 1 kilowatt solar central charging station in Mhondoro district, which is powering a clinic and has the capacity to light up 50 houses. On the research and training side, the Energy Technology Institute also houses the UNESCO Regional Solar Training Facility that offers training to participants from SADC Member States on solar home lighting systems, solar water pumping and mini hydro schemes.<sup>79</sup>

**Partners:** UNESCO, SIRDC

**Title: Solar Cookers Training**

**Description:** With funding from Friedrich Ebert Stiftung, SIRDC's ETI worked on several solar cooking innovations. The solar cookers included a solar cooker box-type, which provides similar functions to a microwave. This box type traps a lot of heat and can be used in cloudy conditions. The products are to be used for the training of entrepreneurs in Zimbabwe on how to build and test solar cookers. The institute has finished building two Zimbabwean models of solar cookers. These are ready for marketing. A Lutheran Women Organisation in Zimbabwe has made orders to provide for rural homes. The project started in 2004 and was completed in 2007.

**Partners:** Friedrich Ebert Stiftung, SIRDC

**Title: Solar Street Lighting**

**Description:** This is a completed Research and Development project, which is ready for commercialization. The product represents the first solar streetlight to be designed and built in Zimbabwe with built-in innovative switching control and charging mechanism. The light is an environmentally friendly product since it uses solar power in its operations and does not require electricity cables. It is a stand-alone system and can be erected in remote areas, which are far away from the electricity grid. The light automatically switches on at sunset and switches off at sunrise.

**Partners:** Government of Zimbabwe, SIRDC

**Title: Women in Business and Skills Development Project**

**Description:** This is a community-based income generating project aimed at financially empowering the women in Gwanda through the provision of environmentally friendly means of drying their agricultural produce and selling it off-season to fetch high prices. Under this project, ETI built two solar driers for the "Women in Business and Skills Development Project", developed training materials and offered training to the community on how to use the driers.

**Partners:** Local Women organisations, SIRDC

**Title: Solar Components Development**

**Description:** ETI, together with the Ministry of Energy and Power Development and the Japanese International Cooperating Agency (JICA), organized four seminars

---

<sup>79</sup> Interview with Mr Mudembe Energy Technology Institute SIRDC

for the solar system components manufacturers to report on the institute test findings of locally manufactured / available batteries, charge controllers and solar tubes. Recommendations for the improvement of the above named solar system components were also presented at the seminars.

**Partners:** JICA, Government of Zimbabwe, SIRDC

**Title:** **UNESCO Summer School for Solar Energy for English Speaking Africa**

**Description:** The ETI, together with UNESCO organised two summer schools for the solar energy stakeholders in East and Southern Africa for training on solar energy. This covered areas like solar technology, system performance, testing and troubleshooting, system sizing and cost. Drawing from the successes of these summer schools, ETI was requested to train Namibian entrepreneurs on the construction and testing of efficient biomass stoves.

**Partners:** UNESCO, SIRDC

**Title:** **Solar Water Heater and Home Systems Project**

**Description:** This provides continuous heating of the water in summer and can be connected to electricity during the winter season. It is a hybrid system. The geyser can be in different sizes and are meant for household use. The solar home system is for home lighting in rural and urban areas; powering of light electrical gadgets e.g. radio, television, computers, etc; and emergency lighting for buildings. The product has a life span of 20 – 25 years. It is fitted with charge controller to regulate battery charging and discharging cycles. It has low maintenance cost, thus long maintenance interval/period before next check up. The project ended in 2005 and products are ready for marketing.

**Partners:** EU through Practical Action.

#### **Wind Energy Initiatives**

**Title:** **Promoting Sustainable Provision of Renewable Energy - Power from Wind**

**Description:** The Zimbabwe Regional Environment Organization – ZERO, a NGO, implemented phase two of this project from November 2004 to December 2006 at a cost of US\$50,000.<sup>80</sup> The objectives of the Temaruru Community Power Trust were: to install a wind turbine to supply electricity to the school, clinic and pump water for the irrigation scheme; to upgrade wind turbines at the business centre and support the production and marketing of farm produce; to provide energy efficient stoves to reduce the rate of firewood consumption; to engage in afforestation activities that include the planting of *Jatropha* and Moringa trees; and to raise local level awareness on climate change, energy conservation and efficiency issues.

**Partners:** GEF, ZERO

**Title:** **Wind Power Potential in Zimbabwe**

**Description:** There is potential for the use of wind power though limited to pumping water rather than for electricity generation in Zimbabwe. In areas of low wind regimes, electricity can be produced at small power levels (1 to 100kW) and from hybrid systems with micro photovoltaic generators for isolated sites in

---

<sup>80</sup> GEF Small Grant Programme: <http://sgp.undp.org/index.cfm>

rural areas. Wind energy technology development has a more attractive investment potential as it offers less capital investment than hydro and thermal power generators, because wind driven turbines generate electricity as soon as they are installed, unlike hydro and thermal power generators which require more infrastructure development. A small wind farm was established at Tamaruru Business Centre near Rusape and six wind turbines of 1kwh were installed to power shops<sup>81</sup>.

**Partners:** Government of Zimbabwe

---

<sup>81</sup><http://www.energy.gov.zw/An%20overviewe%20of%20the%20energy%20situation%20in%20Zimbabwe.doc>

#### 4. IDENTIFIED GAPS, CONSTRAINTS AND OPPORTUNITIES

While a lot is happening in the SADC region as far as basic energy initiatives is concerned, there are some gaps, constraints/challenges and opportunities in various ways. A summary of the gaps, constraints and opportunities include:

- Lack of required information to assess the feasibility of certain projects. For example, one of the barriers to the installation of windmills for water pumping and wind turbines in southern Africa is the lack of reliable wind data. Prior to initiating a wind energy project the local wind regimes should be well known.
- Data not in usable format. For instance, in cases where recent wind data is collected by the meteorological departments, it is often in a format which is not usable i.e. unprocessed data.
- Data not easily accessible even if it is available. It is also not easily possible for third parties to get insight in the data without paying exorbitant amounts of money.
- Experience from the survey has shown that, to increase access to electricity services at the local level is not only about introducing new technologies, but is also a process of transferring knowledge, skills, building institutional capacity (technical, managerial and financial) framework and developing viable businesses and partnership at different levels, from local to national.
- Sustainability of projects especially in low-income groups depends on user involvement. In cases where users were not involved, projects were abandoned and products vandalized by the locals for they did not have ownership of the project.
- Most of the basic energy initiatives do not go beyond provision of energy to income generating initiatives. The initiatives should be integrative to achieve poverty alleviation.
- There is still great need to link basic energy initiatives to climate change mitigation and adaptation strategies.
- Knowledge of various basic energy is still scanty and scattered across the region. There is need for a central regional institution to comprehensively document all the initiatives and make them available for wider access. A regional database on basic energy initiatives should be developed to help in creating synergies. There should also be an expert database on such initiatives.
- In some initiatives gender concerns were/are not recognized hence success of the project is compromised.
- While many of these initiatives are being successful in the various countries through various energy platforms, the focus is mainly on lighting, heating and cooking. Few initiatives focus on promoting income-generating activities.
- Training of the users is often not considered part of the project. Projects with little community participation are not sustainable. They have often ended up as white elephants.
- Africa is said to be the continent that will be hardest hit by climate change, but currently benefits least from the Clean Development Mechanism (CDM). Around two percent of the registered CDM projects in the world are located in Africa. The main reasons include lack of awareness, policy and infrastructure planning, and also limited financing.
- Southern Africa has many hotspots, which are not being harnessed into geothermal energy.

## 5. CONCLUSION

Many countries in southern Africa have the potential to produce enough energy for their needs if they have the capacity to exploit the abundant resources at their disposal, such as solar, wind, hydro, and biofuels. The survey established that there are various interventions in basic energy and at times similar initiatives being implemented by different agencies in the same country. This situation calls for collaborative efforts and a coordinated approach to achieve greater results.

The survey established that across the SADC countries, initiatives have been concentrated mainly on biofuel particularly, biomass and on solar energy. Thus other energy platforms such as hydroelectric, wind energy and biogas remain under-utilised yet opportunities are available. There is therefore need to develop and promote improved and more energy efficient and access solutions in all platforms.

The survey has also proved that basic energy initiatives, which are mainly renewable energy resources, have the potential to improve access to affordable clean energy services thereby improve livelihoods in rural and peri-urban areas through either complementing or as alternatives to conventional sources of energy. This has been noted in the long-term primary and secondary impacts of basic energy initiatives which include: income generation, employment; extended working hours, businesses closing late; and creation of new businesses, such as barbershops, phone charging and oil pressing. Other impacts are: improved health as harmful gases emitting devices such as kerosene lanterns, candles and woodfuel are being substituted; improved gender equality and empowerment of women participation in decision-making and businesses.

The survey also noted that there seems to be no legal framework on basic energy in some SADC countries. While almost all SADC Energy Ministries have policies on rural electrification many are yet to come up with Renewable Energy Policies that support the basic energy initiatives. There is also lack of a budget towards such initiatives. On the overall, the main constraint to the accelerated use of renewable energy technologies is the high up-front investment costs and most of the equipment/materials are imported requiring foreign currency.

There is also a wide disparity between countries in the levels of energy access and in efforts being made to improve the situation. South Africa has made impressive strides, particularly in solar energy while Tanzania and Zimbabwe seem to take the lead in biomass energy initiatives.

To conclude, all SADC countries have embarked on basic energy initiatives including provision of services such as research, training, and marketing. Some of the initiatives also support the Clean Development Mechanism an arrangement set and agreed in the Kyoto Protocol.

## 6. WAY FORWARD AND RECOMMENDATIONS

Based on the findings the survey makes the following recommendations to develop and promote more efficient energy solutions for the majority of the population, and to strengthen collaborative efforts on the side of International Cooperating Partners:

- National policies to incorporate basic energy technologies in their national plans and budgets.
- Development of a broad-based policy framework to achieve widespread dissemination of basic energy initiatives in SADC Member States, including relevant government departments, electricity utilities, private sector, research institutions, financial institutions, support and community-based groups.
- Data-sharing policy at SADC level to promote collaboration and coordination of activities.
- Identification of local priority needs/opportunities assessment through involving the beneficiaries at the designing stage of the project.
- Involve Voluntary Carbon Markets (VCM) projects in the process of applying for carbon credits, and generate awareness in this regard.
- Utilise appropriate technology for rural communities and ensure that technology transfer ensures project sustainability.
- Energy ministries and national institutions assigned to energy access development should have updated websites if data is to be readily available.
- Technical, commercial and environmental constraints such as accessibility (road), power needs, distance to consumption centres, land use restrictions, site ownership, ecological, noise, effect on local economy, and safety assessment should be taken into account when assessing any potential site for basic energy initiatives.
- More research, and development of basic energy initiatives to address the energy crisis in the region.
- Development of a regional repository is important in fostering regional knowledge on basic energy information exchange.
- More research is required in basic energy initiatives as the information is scattered and not readily available through a desk survey. This survey was a rapid assessment and there is need for a more comprehensive survey supported by field visits to Member States with time for verification of results and adequate analysis which was not possible within the timeframe for this quick study.
- While it was quite clear that there are so many initiatives taking place throughout the SADC region, there was little evidence of a coordinated approach at the level of the ICPs or the Member States, despite a regional policy defined in the SADC Energy Protocol. Opportunities for strengthening regional and international cooperation should be explored.

## REFERENCES

CEF (2009), Generating Electricity from thin air, from, The Energy Journal, Issue 1 pp 8, 2009

CRSES, (2008) Renewable Energy Solutions for Off-Grid Guest Houses and Farms Centre of Renewable and Sustainable Energy Studies, Stellenbosch University, South Africa

Emmermacher B.(2006). Solar Water Pumping in Namibia. Renewable Energy and Energy Efficiency Programme REEEP Southern Africa.

GENEZ (2009) “Dutch stove project demonstrates potential to give new lease of life to disabled women” Gender and Energy Network of Zimbabwe, Issue 2 pp 4 March 2009, Harare

IUCN (2007) World Energy Outlook The magazine of the World Conservation Union July 2007

Jones, S. and Peterson, C. (2002) Using Unmodified Vegetable Oils as a Diesel Fuel Extender. University of Idaho

ProBEC (2009) “Tobacco barns and charcoal stove projects in Zambia” Burning Issues, ProBEC newsletter March 2009

SADC (1996) SADC Energy Protocol

SARDC (2007), “Basin states incorporate gender concerns in energy solutions” The Zambezi Vol. 7, no 3, pp 5, SARDC Harare

SADC-SARDC, (2008), “Solar power brings hope for rural clinics in Madagascar” SADC Today Vol.11 No.3, pp E2 December 2008. SARDC, Harare

SADC-SARDC (2007), “Rays of hope”, SADC Today Vo.9 No.6 pp 8, February 2007. SARDC, Harare

SEED Sustainable Energy Africa (2007). City of Jo’burg: energy and climate change files. e-SEED Vol.6 No.3pp 8 Johannesburg

Singh, B (2005) Bio-gas Plant: Generating Methane from Organic Wastes, SESI Journal 15(2): pp 33 Station, Ajitmal, Etawah

TaTEDO (2008) “African Rural Energy Enterprises Development (AREED) (Phase II)” TaTEDO Newsletter Issue No. 6 pp 18 June 2008, Dar es Salaam

UNFCCC (1992) Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC)

UNDP (2007) Gender and Energy for Sustainable Development a Toolkit and Resource Guide United Nations Development Programme

## APPENDIX

### List of Organisations Consulted

<b>ANGOLA</b>	
Ministry of Energy and Water	Av. 4 de Fevereiro, 105-4 Andar, Luanda ANGOLA Tel +244 222 39 36 81
ENE	Prédio Geominas, 6th - 7th floors, Luanda ANGOLA Tel +244 2-311529 Fax +244 2-323382
<b>BOTSWANA</b>	
Ministry of Minerals, Energy and Water Affairs	P/Bag 0018 Gaborone, BOTSWANA Tel +267 365-6600 Fax +267 372-738
Botswana Power Corporation	PO Box 48, Gaborone, BOTSWANA Tel +2673603203 Fax +267 397-3563
University of Botswana	4775 Notwane Rd. Private Bag UB 0022, Gaborone, BOTSWANA Tel +267 355 0000 Fax +267 395 6591
<b>DRC</b>	
Ministry of Energy	Building Regideso, Blvd du 30 Juin, Kinshasa, Gombe, DEMOCRATIC REPUBLIC OF CONGO Tel: +243 99 85 91 462
SNEL	2831 Av de la Justice, Kinshasa DEMOCRATIC REPUBLIC OF CONGO Tel +243 8843732 Fax +243 1233667 Email <a href="mailto:snellgd@ic.cd">snellgd@ic.cd</a>
<b>LESOTHO</b>	
Ministry of Natural Resources Water, LHWP, and Energy, Mining	P. O. Box 772, Maseru LESOTHO Tel +266 22323163 Fax +266 22310527
Lesotho Electricity Company	P. O. Box 423, Maseru 100, LESOTHO Tel +26622 312 236 Fax +266 22 310 093 Email <a href="mailto:info@lec.co.ls">info@lec.co.ls</a>
Bethel Business and Community Development Centre	P.O. Box 53, Mt. Moorosi 750, LESOTHO
PROBEC National Advisory Group and other relevant stakeholders for Lesotho	Chairperson of NAG Mr Jerry Seithleko Department of Energy, P/Bag A91 Maseru 100, LESOTHO
<b>MADAGASCAR</b>	
Ministry of Energy and Mines	Rue Farafaty, Ampandrianomby, Antananarivo, 101 MADAGASCAR Tel +261 20 22 595 59 Fax +261 20 22 595 56
JIRAMA	149 Rue Rainandriamampandry, Antananarivo, 101 BP 200, MADAGASCAR Tel +261 20 22 66031 Fax +261 20 22 23076
<b>MALAWI</b>	
Ministry of Lands, Natural Resources and the Environment (Department of Energy)	Capital Hill, Private Bag 309, Lilongwe MALAWI Tel +265 1 770 688 Fax +265) 1 770 094 Email <a href="mailto:doenergy@malawi.net">doenergy@malawi.net</a>
National Advisory Group and other relevant stakeholders in Malawi	Mr Vincent Gondwe, ProBEC National Coordinator Plot 319 / Area 10, Lilongwe MALAWI Email <a href="mailto:vygondwe@yahoo.com">vygondwe@yahoo.com</a>

ESCOM	Electricity Supply Corporation of Malawi Limited ESCOM House, 9 Haile Selassie Road P. O. Box 2047, Blantye MALAWI Tel +265 1 822 000 Fax +265 1 822 008 Email <a href="mailto:info@escommw.com">info@escommw.com</a>
<b>MAURITIUS</b>	
Ministry of Renewable Energy and Public Utilities	Level 10, Air Mauritius Centre, John Kennedy Street, Port Louis MAURITIUS Tel +230 211 0049 Fax +230 208 6497 Email: <a href="mailto:mpu@mail.gov.mu">mpu@mail.gov.mu</a>
Central Electricity Board	Royal Road, Curepipe MAURITIUS Tel +230 601 1100 Fax +230 675 7958 Email <a href="mailto:ceb@intnet.mu">ceb@intnet.mu</a> Hotline 130
Mauritius Research Council,	La Maison de Carné, Royal Road, Rose-Hill MAURITIUS Tel +230 465 1235 Fax +230 465 1239 Email <a href="mailto:mrc@intnet.mu">mrc@intnet.mu</a>
<b>MOZAMBIQUE</b>	
Ministry of Energy	Av. 25 de Setembro, 1218, 3º Andar, Maputo, MOZAMBIQUE Tel +258 21 303265 Fax + 258 21 313971
EDM	Avenida Agostinho Neto, 70, C.P. 2447, Maputo MOZAMBIQUE Tel +258 21 492011 / 4 Fax +258 21 493002
ProBEC National Co-ordinator Mozambique	Mr Antonio DNJ Malalane Ave Mao Tse Tung, 858, Maputo MOZAMBIQUE Tel +258 21 486211 Fax +258 21 486210 <a href="mailto:antonio.malalane@gtz.de">antonio.malalane@gtz.de</a>
<b>NAMIBIA</b>	
Ministry of Mines and Energy	Geological Survey Building, 1 Aviation Road, Private Bag 13297, Windhoek, NAMIBIA Tel +264 61 284 8111 Fax +264 61 238 643
NAMPOWER	NamPower, 15 Luther Street PO Box 2864, Windhoek NAMIBIA Tel +264 61 205 4111 Fax +264 61 232 805
National Advisory Group and other relevant stakeholders for Namibia (PROBEC)	Sonia Lioret ProBEC Regional Co-ordinator (Swaziland, Namibia) <a href="mailto:sonia_lioret@hotmail.com">sonia_lioret@hotmail.com</a>
<b>SEYCHELLES</b>	
Public Utilities Corporation	Electricity Division, Electricity House, Roche Caiman P. O. Box 174, Victoria SEYCHELLES Tel +248 67 80 00 Fax +248 32 10 20
<b>SOUTH AFRICA</b>	
Ministry of Minerals and Energy	Private Bag X646, Pretoria 0001 Mineralia Centre, 391 cnr Andries and Visagie Streets Pretoria, SOUTH AFRICA Tel +27 12 317 8291 Fax +27 12 322 8699
ESKOM	P.O. Box 1091, Johannesburg 2000 SOUTH AFRICA Tel +27 11 800 8111

<b>SWAZILAND</b>	
Ministry of Natural Resources and Energy	P.O. Box 57, Mbabane SWAZILAND Tel +268 404 6244/8 Fax +268 404 7252 Email <a href="mailto:nergy@realnet.co.sz">mailto:nergy@realnet.co.sz</a>
SEB	Swaziland Electricity Company P.O. Box 258, Mbabane SWAZILAND Tel +268 409 4000 Fax +268 404 2335 Email <a href="mailto:info@sec.co.sz">info@sec.co.sz</a>
<b>UNITED REPUBLIC OF TANZANIA</b>	
Ministry of Energy and Mineral Resources	P.O. Box 2000/9152, Dar es Salaam UNITED REPUBLIC OF TANZANIA Tel +255 22 2117153 Fax +255 22 2116719 Email <a href="mailto:madini@africaonline.co.tz">madini@africaonline.co.tz</a>
TANESCO	Ubungo Head Office, Umeme Park Building P.O. Box 9024 Dar es Salaam UNITED REPUBLIC OF TANZANIA Tel +255 22 245 1130-9 Email <a href="mailto:info@tanESCO.com">info@tanESCO.com</a>
Tanzania Traditional Energy Development and Environment Organisation (TaTEDO)	Mr. Estomih Sawe Secondary Contact PO Box 32794, Dar es Salaam United Republic of Tanzania Tel +255 231 999 8767 Fax +255 22 277 4400
National Advisory Group in Tanzania	ProBEC National Coordinator Arfaksad Ndilanha, c/o GTZ Head Office PO Box 1519, Dar es Salaam UNITED REPUBLIC OF TANZANIA <a href="mailto:probec.gtz-tanzania@gtz.de">probec.gtz-tanzania@gtz.de</a>
<b>ZAMBIA</b>	
Ministry of Energy and Water Development	Mulungushi House, Independence Ave / Nationalist Rd PO Box 36079, Lusaka ZAMBIA Tel +260 1 252 589 Fax +260 1 252 589
ZESCO	Public Relations Manager ZESCO Ltd, P.O Box 33304, Lusaka ZAMBIA Tel +260 1 228 084
<b>ZIMBABWE</b>	
Ministry of Energy and Power Development	Permanent Secretary Ministry of Energy and Power Development Ground Floor, Chaminuka Building Cnr. Fourth Street/Central Avenue Private Bag 7758, Causeway, Harare ZIMBABWE Tel +263 4 733 095/9 Fax +263 4 797956 Email <a href="mailto:energy@eta.gov.zw">energy@eta.gov.zw</a>
SIRDC	P O Box 6640 1574 Alpes Road, Hatcliffe, Harare, ZIMBABWE Tel +263 4 860320-9 Fax +263 4 860350-51
ZESA	ZESA Holdings (Pvt) Ltd Electricity Centre, 25 Samora Machel Avenue, Harare ZIMBABWE Tel +263 4 774 508-31 Fax +263 4 774 541-3 Email <a href="mailto:pr@zesa.net">pr@zesa.net</a>

## ICPs and other Regional Organisations

Name of Institution	Contacts
African Development Bank (AfDB)	15 Avenue du Ghana P.O.Box 323-1002, Tunis-Belvédère TUNISIA Tel +216 71 333 511 / 71 103 450 Fax +216 71 351 933 Email <a href="mailto:afdb@afdb.org">afdb@afdb.org</a> <a href="http://www.afdb.org">www.afdb.org</a>
African Rural Energy Enterprise Development (AREED)	15, rue de Milan 75441 Paris CEDEX FRANCE Tel +33 14 437 3003 Fax +33 14 437 1474 Email <a href="mailto:lagbemabiese@unep.fr">lagbemabiese@unep.fr</a> <a href="http://www.ared.org">www.ared.org</a>
Association pour le Développement de l'Énergie Solaire Suisse (ADES) Madagascar	Regula Ochsner Co-President ADES Lanzenstr. 18, 8913 Ottenbach SWITZERLAND Tel +41 26 761 2061 Email <a href="mailto:Regula.Ochsner@adesolaire.org">Regula Ochsner</a> <a href="http://www.adesolaire.org">www.adesolaire.org</a>
BEKA (Pvt) Ltd	13 West View Road, Olifantsfontein Johannesburg, SOUTH AFRICA Tel +27 11 238 0000 Fax +27 11 238 0180 <a href="http://www.beka.co.za">www.beka.co.za</a>
Central Energy Fund (CEF)	Block C, Upper Grayston Office Park 152 Ann Crescent, Strathavon, Sandton 2031 Johannesburg, SOUTH AFRICA Tel +27 11 201 4700 <a href="http://www.cef.org.za">www.cef.org.za</a>
Danish International Development Agency (Danida)	Ms. Mette Knudsen Head of Africa Department, Danida Royal Danish Ministry of Foreign Affairs Asiatisk Plads 2, DK 1448 Copenhagen K DENMARK Tel +45 33 92 00 00 Fax +45 32 54 05 33 Email <a href="mailto:um@um.dk">um@um.dk</a> <a href="mailto:mettkn@um.dk">mettkn@um.dk</a> / <a href="mailto:um@um.dk">um@um.dk</a> <a href="http://www.um.dk">www.um.dk</a>
Department of Minerals and Energy, South Africa	Mineralia Centre, 391 cnr Andries and Visagie Streets, Private Bag X646, Pretoria 001 SOUTH AFRICA Tel +27 12 317 8291 Fax +27 12 322 8699 <a href="http://www.dme.gov.za">www.dme.gov.za</a>
European Investment Bank	Kate Schmitz-Crossey Communication Department European Investment Bank <a href="mailto:info@eib.org">info@eib.org</a>
Energy Sector Management Assistance Program (ESMAP)	HEADQUARTERS The World Bank, 1818 H Street NW Washington, DC 20433, USA Email <a href="mailto:esmap@worldbank.org">esmap@worldbank.org</a> <a href="http://www.esmap.org">www.esmap.org</a>

FID Madagascar Development Intervention Fund	M. Ratsima Rasendra Directeur General, FID Development Intervention Fund Lot III M 39 Ouest Ambohijanahary. Antananarivo MADAGASCAR Tel +22 361 50 Fax 22 336 06 Email <a href="mailto:dirgen@fid.mg">dirgen@fid.mg</a> <a href="http://www.fid.mg">www.fid.mg</a>
Folovhodwe Solar Village Project	Marius Willemse Folovhodwe Solar Village Project SOUTH AFRICA Tel +27 12 998 3375 <a href="mailto:marius@raps.co.za">marius@raps.co.za</a>
FUNAE	256 Rua da Imprensa, 6 <sup>th</sup> floor Rooms 607-610 P.O.Box 2289, Maputo MOZAMBIQUE Tel +258 21 304717 / 4720 Fax +258 21 309228 <a href="http://www.funae.co.mz">www.funae.co.mz</a>
Global Environment Facility Small Grant Programme	304 East 45th Street, FF-956 New York, NY 10017, USA Tel +1 212 906 5039 Fax +1 212 906 6568 Email <a href="mailto:sgp.info@undp.org">sgp.info@undp.org</a> <a href="http://sgp.undp.org">http://sgp.undp.org</a>
GTZ (German Agency for Technical Co-operation / Deutsche Gesellschaft für Technische Zusammenarbeit)	Dag Hammarskjöld Weg 1-5 65760 Eschborn GERMANY Tel +49 6196 79-0 Fax +49 6196 79-1115 <a href="http://www.gtz.de">www.gtz.de</a>
International Solar Energy Society (ISES)	Prof. Dieter Holm President, ISES Africa P.O. Box 58, 0216 Hartbeespoort SOUTH AFRICA Fax +27 12 371 9584 E-mail <a href="mailto:dieterholm@worldonline.co.za">dieterholm@worldonline.co.za</a> ; <a href="mailto:public.relations@ises.org">public.relations@ises.org</a> <a href="http://www.ises.org">www.ises.org</a>
Ministry of Foreign Affairs, Finland	Ministry of Foreign Affairs P.O.Box 176, FI-00023 Government FINLAND <a href="http://www.formin.finland.fi">www.formin.finland.fi</a>
NHO (Confederation of Norwegian Enterprise) Norway	P.O. Box 5250, Majorstuen N-0303, Oslo NORWAY Tel + 47 23 08 80 00 Fax + 47 23 08 80 00 Email <a href="mailto:firmapost@nho.no">firmapost@nho.no</a> <a href="http://www.nho.no">www.nho.no</a>
NORAD (Norwegian Agency for Development Cooperation )	Geir Y. Hermansen Senior Adviser, Energy, Climate, Renewable Energy NORAD Postboks 8034 Dep, 0030 Oslo NORWAY Tel +22 24 20 30 Fax +22 24 20 31 Email <a href="mailto:postmottak@norad.no">postmottak@norad.no</a> <a href="mailto:gyh@norad.no">gyh@norad.no</a> / <a href="mailto:postmottak@norad.no">postmottak@norad.no</a>
Norway Ministry of Foreign Affairs	Departementenes Servicesenter, Einar Gerhardsens plass 3 Postboks 8129 Dep, 0032 Oslo NORWAY Tel +22 24 90 90   Email <a href="mailto:redaksjonen@dss.dep.no">redaksjonen@dss.dep.no</a> <a href="http://www.regjeringen.no">www.regjeringen.no</a>

OVE Denmark (Danish Organisation for Renewable Energy)	Dannebrogsgade 8a, DK - 8000 Århus C DENMARK Tel +45 86 760 444 Fax +45 86 760 544 Email <a href="mailto:ove@ove.org">ove@ove.org</a> <a href="http://www.ove.org">www.ove.org</a>
PRACTICA Foundation	Oosteind 47, 3356 AB Papendrecht NETHERLANDS Tel +31 78 615 0125 <a href="http://www.practicafoundation.nl">www.practicafoundation.nl</a>
ProBEC (Programme for Basic Energy and Conservation)	P O Box 13732, Hatfield 0028, Pretoria SOUTH AFRICA Tel +27 12 339 6633 Fax +27 12 339 6634 <a href="http://www.probec.org">www.probec.org</a>
REEEP (Renewable Energy and Energy Efficiency Partnership)	Amanda Luxande Programme Officer for Southern Africa SANERI [Pty] Ltd, REEEP Secretariat for Southern Africa, PO Box 786141 Sandton 2146, SOUTH AFRICA Tel +27 11 2800765 Fax +27 11 280 0526 <a href="http://www.reeep-sa.org">www.reeep-sa.org</a>
REPIC (Renewable Energy and Energy Efficiency Promotion in International Co-operation)	c/o NET Nowak Energy & Technology Ltd. Waldweg 8, CH-1717 St. Ursen SWITZERLAND Tel +41 26 494 00 30 Fax +41 26 494 00 34 Email <a href="mailto:info@repic.ch">info@repic.ch</a> <a href="http://www.repic.ch">www.repic.ch</a>
Scatec Solar	Katja Nordgaard Director, Scatec Solar Off-grid Projects NORWAY <a href="mailto:katja.nordgaard@scatec.no">katja.nordgaard@scatec.no</a> <a href="http://www.scatecsolar.no">www.scatecsolar.no</a>
SEKAB	Ylwa Alwarsdotter, Marketing Director, SEKAB, Sweden P.O. Box 286, SE-891 26 Örnsköldsvik SWEDEN Tel +46 660 758 00 / +46 660 549 03 <a href="mailto:ylwa.alwarsdotter@sekab.com">ylwa.alwarsdotter@sekab.com</a> / <a href="mailto:info@sekab.com">info@sekab.com</a>
SELF (Solar Electricity Light Fund)	1612 K Street, NW Suite 402 Washington, DC 20006, USA <a href="mailto:info@self.org">info@self.org</a> <a href="http://www.self.org">www.self.org</a>
SETSOLAR	<a href="http://www.setsolar.co.za">www.setsolar.co.za</a>
Sida (Swedish International Development Cooperation Agency)	Ms. Marie Bergström Senior Advisor, Coordinator Energy, Infrastructure and Financing Division, Sida Valhallavägen 199 105 25 Stockholm, T-bana Karlplan Buss 72 och 56, Hållplats Hakberget Reception finns i gatuplanet Tel +46 869 850 00 <a href="mailto:marie.bergstrom@sida.se">marie.bergstrom@sida.se</a> / <a href="mailto:sida@sida.se">sida@sida.se</a> <a href="http://www.sida.se">www.sida.se</a>
Solar Panel Information (SPI)	<a href="http://www.solarpanelinfo.com">www.solarpanelinfo.com</a>
SolarAid	Unit 2, Third Floor, Pride Court 80-82 White Lion Street, London N1 9PF UNITED KINGDOM Tel +44 (0)20 7278 0400 Fax +44 (0)20 7278 0400

	<a href="mailto:info@solar-aid.org">info@solar-aid.org</a> <a href="http://www.solar-aid.org">www.solar-aid.org</a>
Sustainable Energy Africa	The Green Building, 9B Bell Crescent Close, Westlake Business Park, Tokai, Cape Town 7945 SOUTH AFRICA Tel + 27 21 702 3622 <a href="http://www.sustainable.org.za">www.sustainable.org.za</a>
TaTEDO (Traditional Energy, Development and Environment Organization)	PO Box 32794, Dar es Salaam, UNITED REPUBLIC OF TANZANIA Tel +255 231 999 8767 Fax +255 22 277 4400 <a href="http://www.tatedo.org">www.tatedo.org</a>
TRAID (Textile Recycling for Aid and International Development) UK	5 Second Way, Wembley, Middlesex HA9 0YJ, UNITED KINGDOM Tel +44 20 8733 2580 Fax +44 20 8903 9922 Email <a href="mailto:info@traid.org.uk">info@traid.org.uk</a> <a href="http://www.traid.org.uk">www.traid.org.uk</a>
UNEP DTIE (United Nations Environment Programme – Division of Technology, Industry and Economics)	Eric Usher and Fatma Ben Fadhl UNEP DTIE Energy Branch, 15 rue de Milan, 75441 Paris Cedex 09 FRANCE Tel +33 1 4437 1450 Fax +33 1 4437 1474 Email <a href="mailto:unep.tie@unep.fr">unep.tie@unep.fr</a> <a href="mailto:eric.usher@unep.fr">eric.usher@unep.fr</a> ; <a href="mailto:fbenfadhl@unep.fr">fbenfadhl@unep.fr</a> ; <a href="mailto:unep.tie@unep.fr">unep.tie@unep.fr</a>