

About This Bulletin

- Official Bulletin of the Southern African Power Pool for Sustainability
- Reports on success stories and activities on Sustainability in the field of Energy in the Southern African Power Pool
- Spans fields to discuss Environmental Management, Safety issues, Renewable Energy and Energy Efficiency, Climate Change, Environmental and Social Impact Assessments, Resettlement and Compensation issues

Content within this publication

1. Bio – Gasification project – the case of Copper belt Electricity Company (CEC) of Zambia
2. Resettlement Action Plan – the case of ZESCO – Zambia
3. The Standardised Grid Emission Factor for the Southern African Power Pool
4. Compact Fluorescent Lamps(CFLs)- Efficiency Lighting – the case of Zimbabwe Electricity Supply company (ZESA)

1. Bio – Gasification project – the case of Copper belt Electricity Company (CEC) of Zambia

1. Background

The Government of the Republic of Zambia through the National Energy Policy promotes the establishment of renewable energy technology in the country. Further to this, the government encourages private sector participation in all energy projects especially renewables. CEC recognizes the potential of renewable energy in both providing a cheaper energy alternative and combating current environmental concerns such as climate change. The company has therefore placed itself at the forefront of selected renewable energy technologies in the Southern African region (CEC Strategic Plan 2011-2012) and is actively pursuing renewable energy initiatives. The biomass gasification power plant project is one of a number of renewable energy initiatives that CEC has embarked on and henceforth presents the project in this brief. Whilst the plant's financial performance is expected to be marginal, it is recognised that this is a project of strategic importance to both CEC and the nation. The proposed project is envisaged to assist in establishing biomass gasification technology at a scale that can be used to power off grid towns that are currently fed by diesel generators, using a technology that is cheaper than diesel generation and a fuel that is environmentally sustainable. The value chain will also engage local communities through the provision of biomass to the power plant.

Biomass gasification is considered one of the most convincing forms of renewable energy in the global quest to becoming carbon neutral. There is currently very little gasification carried out on a large or commercial scale, but, as the use of biomass and gasification become more widespread, the more popular and important gasification will become (*Biomass Engineering UK, 2012*). It is for this reason that CEC opted to choose biomass as a renewable energy option, i.e. as a way of contributing to the global quest of becoming carbon neutral. Secondly, this project when up and

running will provide a better alternative for sawdust reduction/management, of which the current practice is storage at site and/or dumping at disposal sites.

2. Project Description

The project aims to develop, construct and operate a biomass gasification power plant that will utilise forestry biomass from the Copperbelt Province of Zambia to generate 1MW electricity at a site within Kitwe District, Copperbelt Province. The project site is located within a privately owned sawmill in Kitwe and hence close to a feedstock (saw dust and off-cuts) source. An Environmental Impact Assessment (EIA) was done for the project as prescribed under Zambian Environmental Law.

The project is currently in its pre-construction phase. The plant will be constructed with two (2) streams of gasification systems coupled to two gas engines to deliver a net power of about 500 kWe from each engine. The overall scope of the project involves, fuel processing (mainly woody



residues, agro residues will act as a secondary source) into briquettes, gasification system comprising of reactor, cooling and cleaning system, water treatment and gas engines for power generation.

The plant will have a nominal plant load factor estimated to produce about 5.9 Million kWh of electricity during the first year and about 7.4 million kWh per annum thereafter. Annual biomass consumption at the rated output is 11,000 TPA

3. Project Environmental & Social Aspects

Generally the project will have low negative impacts on the environment, though measures will be put in place to control mainly air and noise pollution. To do this the plant will be equipped with air pollution abatement equipment (filters) to trap air pollutants and will be enclosed within a storage hall (structure) to reduce noise.

From a positive aspect, the project will divert wood waste from landfills (disposal sites), reduce the amount of wood waste dumped at the municipal disposal site and stored at saw mills within the District and in turn reduce the production and atmospheric release of methane at disposal sites, which is a potent greenhouse gas.

The project may bring about positive impacts in the local economy by the purchase of biomass locally, from saw millers and farmers. The proposed project will provide an additional and efficient supply of power to the surrounding area and employment at both construction and operational phases.

Submitted by Wizaso Munthali CEC, Zambia

2. Resettlement Action and Compensation Plan – the case of ZESCO – Zambia

1. Background

The Government of the Republic of Zambia, through ZESCO, intends to construct a 750MW power station on the Kafue River in Kafue Gorge area, Mazabuka District, Southern Province. The Kafue Gorge Lower Hydroelectric Power Project (KGL Project) is located on the Kafue River, a primary tributary of the Zambezi River. It is located on the left bank of the Kafue River in Namalundu Gorge, 55km away from the downstream confluence of the Kafue and Zambezi Rivers, 17.3km downstream of the existing 900MW Kafue Gorge Upper Hydropower Station dam (reservoir). The project area covers three districts, namely Mazabuka in Southern Province,

Chirundu and Chongwe in Lusaka Province. An **Environmental and Social Impact Assessment (ESIA)** study was undertaken in line with the national Environmental Impact Assessment Regulations and the project was approved by the Zambia Environmental Management Agency. During the ESIA study, it was established that there were 25 households living in the project area in Kafue Gorge who needed to be relocated to pave way for the project. The affected households were engaged in farming during the rainy season and fishing during the dry season. In terms of preferred place of resettlement 13 households chose to go back to Hachipilika Village, their place of origin located about 30km from the project site. The other 12 households chose to relocate to different places within and outside District. The resettlement package for the project has two components;

- (a) Support to households directly affected by the project
- (b) Support to the host community.

2. Support to the Affected People

Support to the affected people covers the following:

- Construction of standard houses for affected people
- Compensation for non-housing assets such as fruit trees and crops
- Agricultural support (farming inputs and agricultural training)
- Provision of agricultural land (the Headman and the Chief had made land available for the affected people).
- Repatriation allowance
- Transportation to their destinations

The project will build houses for the 13 affected families relocating to Hachipilika Village. Since the other 12 families are relocating to different and scattered places, it is logistically difficult for the Project to hire contractors to build houses for them. Instead, each of the 12 families will be given funds to build their own house in the place they are relocating to. The local ZESCO office will monitor the construction of houses and how the affected people are settling down.

3. Support to the Host Community

Hachipilika village has a standard Government basic school which caters for pupils from Grade 1 to Grade 9. The Hachipilika community has had no health centre. They travel for 40km to the nearest hospital to seek medical services. This prompted the community to embark on a project to build a health post.

They managed to build it to roof level. Support to the host community (and also for the benefit of the in-coming affected families) covers the following:

- Construction of two standard dormitories with water-borne ablution facilities at the school.
- Construction of cooking shelter and a multipurpose service building
- Construction of water borne toilets for the staff at the school
- Completion of the health centre and provide water borne toilets
- Construction of two standard staff houses for the health personnel
- Provision of piped water supply to the school, health centre and the local community
- Construction of a standard gravel road to Hachipilika (3km).
- Construction two standard houses for the Headman Hachipilika and Chief Sinadambwe as a corporate social responsibility on the part of ZESCO.

4. RESETTLEMENT ACTION PLANS CURRENT STATUS

A contractor has been hired to undertake all the infrastructural works in the Hachipilika resettlement village. As at 31st January, 2013, the works were 97% complete. During construction, the local people benefited by getting short term jobs from the contractor.

Fig 1. One of the Houses for the Affected People



Fig 2. One of the Houses Built for the



Regular meetings have been held with the affected people to update them on the resettlement program and to give them an opportunity to air any concerns which they may have. Ministry of Community Development was engaged to counsel them to prepare them for the impending relocation. Agricultural training will be provided also.

5. Institutional Arrangement and Collaboration.

ZESCO has formed a Project Implementation Unit (PIU) to oversee the implementation of the Kafue Gorge Lower Project, include RAP activities.

6. Conclusion

With the commitment and support of the Zambian Government and ZESCO, the implementation of the RAP is going on well. The smooth implementation of the RAP has been achieved through regulation consultation and participation of both the affected people and the host community.

Submitted by Mellon Chinjila, ZESCO

3. The SAPP Grid Emission Factor

1. Introduction

A Grid Emission Factor outlines average CO₂ intensity of the electricity system. It is an input to a baseline that defines emission reductions on top of operations deemed “Business as Usual” It is used in conjunction with various methodologies to calculate carbon credits such as Certified Emission Reductions (CERs) for Clean Development Mechanism(CDM) projects. The current SAPP Pool Plan features 86 projects with additional installed capacity of 31, 000MW of which at least 1/3 being hydropower.

With financial support from the German Federal Ministry of the Environment UNEP and the UNEP Risoe Centre, the SAPP initiated a study to examine how to best take into account exports and imports of electricity across the national boundaries in the South African Power Pool (SAPP) and to systematically analyse issues associated with the sub-regional grid electricity system in order to develop national grid emission factors (GEFs) in SAPP member countries for application in Clean Development Mechanism projects. . The study identified a common electricity system comprising of nine interconnected countries, with only three in the SAPP yet to be connected. The nine interconnected are:

South Africa, Botswana, Lesotho, Swaziland, Mozambique, Zimbabwe, Zambia, Namibia and DRC. Countries yet to be interconnected are Angola, Tanzania and Malawi.

2. What is Standardised Baseline?

Standard Baseline simplifies Carbon Accounting by establishing a pre-defined sectoral benchmark linked to homogeneity of sector or technology, (e.g. power output). Instead of determining baseline on a case by case basis, the calculated can be used as baseline for a multiple CDM Projects. The "Plug and Play "nature means that uncertainties and costs related to establishing additionality, calculating or validating baselines project emission reductions are reduced. This is mandatory for all CDM projects and is valid for three years after which it will have to be revised. It is aimed at increasing more equitable distribution of CDM.

3. SAPP GRID EMISSION FACTOR (GEF) Results

The combined Margins for the SAPP GEF are as follows:

- **Baseline for Wind and Solar projects: 0.9801**
- **Baseline for Hydropower Projects, DSM and Energy Efficiency projects : 0.9644**

This means that for roughly 1.025 MW of power generated by cleaner technologies or saved through Demand Side Management measures, 1 carbon credit could potentially be claimed.

4. What are the Main Benefits of the STANDARDISED BASELINE?

The Benefits of the Standardised Baseline are that:

- It reduces time to market and transaction costs for new CDM projects and Programmes of Activities (PoAs)
- It increases attractiveness of CDM investments in SADC. Beyond RSA, few CDM projects have been registered in the power sector and there are no national GEFs published.
- It stands to make a real contribution towards better regional distribution of CDM projects
- Contributes towards more integrated regional framework approaches to energy security, access, climate mitigation and finance. Linkable to regional energy and infrastructure investment plans and other planned Energy Efficiency programmes

Some of the projects that can be considered for CDM Funding



Submitted by Johnson Maviya, Southern African Power Pool

4. Introduction on CFLs in Zimbabwe

1. Introduction

The Zimbabwe Electricity Supply Authority (ZESA) like other utilities in the region plans to roll out a Compact Fluorescent Lamps free exchange project country wide. This project is one among the several demand side management strategies being pursued in order to save electricity. The project entails the removal of an estimated 5.5 million incandescent light bulbs and their replacement with CFLs in the domestic sector and public institutions during the first phase. ZESA expects to save about 185MW through this project. A protracted lamp procurement process has delayed the roll out which was supposed to take place ahead of the winter peak period - May to August but a lot of ground work has been done in preparation of the roll out.

2. Key Features of the Roll out

- Free exchange of working incandescent lamps with CFLs in the domestic sector and public institutions - Government Hospitals, Schools, Training Colleges
- Engagement of installation companies in each urban centre to carry out the exchange
- Formation of the ZESA Project Steering Committee consisting of the following sub committees
 - i. Technical sub committee
 - ii. Marketing and Media sub committee
 - iii. Environmental Management sub committee
 - iv. Security sub committee
 - v. Logistics sub committee
- Engagement of a consultant to undertake Monitoring and Verification
- Crushing of all the removed incandescent lamps

3. Environmental Management Issues - Preparing the Road

Like in any project, environmental and health issues associated with this project were given high priority. A lot of dust was raised following the circulation on the internet, of images of people with open wounds attributed to CFLs. The circulation of the e-mail coincided with the press reports in which the public was told that ZESA will soon be issuing free CFLs to all households. While some eagerly awaited the delivery of these free goods, others waited with a long list of searching questions. So people talked out there and they needed answers and assurance that the project will be environmentally and socially sustainable. The main concern was that of mercury that is contained in the CFLs. The range of questions meant that the environment and marketing sub committees had to be vigilant and provide information allaying public fears. To allay these fears, a Strategic Environmental Assessment (SEA) for the project was carried out.

A waste management strategy was proposed for the project. The strategy consisted of the following:

a) **Management of Incandescent bulb waste** – generally inert waste to be disposed through municipal landfills. Consultation with all municipalities was undertaken to check availability of dumping space

b) **Management of CFL waste** – the CFLs to be installed have a life-span of at least 3 years. CFL waste will only become an issue as from year 3. The roll out however still has to take care of CFLs that may break during installation and those that may fail prematurely. To cater for these breakages, temporary CFL storage drums will be placed at every ZESA depot country wide. More will be added during the third year of the project when the CFLs are expected to start failing. In terms of the Environmental Management Act, each urban local authority is required to have a hazardous waste treatment/disposal facility by the end of 2012. It is thus hoped that by the time these CFLs start failing, the country will have the necessary infrastructure to handle hazardous waste thus enabling a sustainable management programme for hazardous waste in general.

All major urban municipalities have been individually consulted and appraised about the project. While most of them have landfills for disposing general waste, a few do not even have disposal sites for this kind of waste. Only two of them indicated that they have hazardous waste disposal sites. The management of all waste arising from the implementation of the project seem to be the yardstick with which the project's environmental performance will be judged. Utilities that are still to go on this journey better watch out on this aspect.

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