



renewable
energy
& energy
efficiency
partnership



The Gold Standard®
Premium quality carbon credits

CASE STUDY ON GS652

January 10, 2011

Researched and written by Michelle du Toit and Emily Tyler

Edited by William Theisen

Project name: Dissemination of Fuel Efficient Biomass Stoves in South Africa

Gold Standard Registry identification number: GS652

Project location: Johannesburg, South Africa

Project Methodology: Indicative Programme, Baseline, and Monitoring Methodology for Improved Cook-Stoves and Kitchen Regimes, GS VER Methodology

Project type: VER

Project developers: E+Carbon, Inc.

I. Project Overview

The “Dissemination of Fuel Efficient Biomass stoves in South Africa” project is a joint venture between Hewmatt Energy, based in Johannesburg, South Africa and American based E+Carbon. This project aims to replace traditional three stone open-fire cooking with fuel-efficient biomass cookstoves for impoverished schools in South Africa. The project began with local entrepreneur McWilliam Mabaso, a Malawian national, who lives in Johannesburg. McWilliam developed a new cookstove for industrial scale cooking, which uses the rocket-stove design¹. This case study will explore the challenges and bottlenecks encountered during the development of the project, the actors involved, and the outcomes of the case study work.

Local Entrepreneur - McWilliam Mabaso:

McWilliam Mabaso, who has a masters degree specialising in the efficacy of household stoves at the University of KwaZulu-Nata, started his professional career in Malawi as a forester. He first came into contact with fuel-efficient biomass cookstoves (cookstoves) while working on a World Bank funded reforestation project in the 1980s and again while working for ProBEC in Malawi.



McWilliam wanted to start a business that would combine his deep commitment to assisting impoverished communities and provide for his family. McWilliam worked with GTZ ProBEC (ProBEC) who supported McWilliam’s business idea to design, manufacture and distribute biomass cookstoves within South Africa and assisted in the elaboration of his business idea and the business launch. ProBEC also provided McWilliam with the capital to produce his first pilot stoves (20 large industrial and 20 smaller household stoves) and provided valuable contacts in the industry. McWilliam and his wife Martha registered Hewmatt Energy Southern Africa in 2008. The next task was to refine

the company’s focus by identifying a suitable market for his stoves in order to develop a viable and sustainable business model.

¹ This rocket stove design consists of a steel cylinder, which can hold a 100-litre pot at the head. The cylinder has an insulating ceramic and brick inner and forms a combustion chamber thereby making better use of the energy in wood.

Cooking for schools

McWilliam targeted certain primary schools in rural areas of South Africa that are part of the National School Nutrition Programme (NSNP), a government sponsored program that aims to provide six million learners with daily free cooked meals. School meals are prepared on gas stoves supplied by the Department of Basic Education. However, the schools receive only enough gas for two weeks of cooking per month. While some schools simply cannot supply additional meals, others switch to open wood fires to cook the second half of the month's meals². Of 18,039 schools participating in the NSNP, 14,108 cook on open fires³, purchasing wood through local contractors.

Cooking on open fires is highly inefficient and the fuels are expensive and labour intensive. This contributes toward respiratory disease and can burn users. Meals, which are a major incentive for students to attend school, cannot be prepared using outdoor cooking on rainy days, which often leads to decreased attendance rates. McWilliam believes the biomass cookstoves would help schools save money and consistently provide meals to children. These stoves decrease energy use by 50% and result in substantial financial saving to schools.



This is the traditional way of cooking at schools (left). School cooks using the new efficient cookstoves (right).

McWilliam chose three schools in Bronkhorstspuit, a town 75km from Pretoria and 90 km from Johannesburg for his pilot study. The town Bronkhorstspuit is close to the airport and South Africa's capital, Pretoria, making it easier for policy makers and other interested parties to visit.

The Challenge of Financing

ProBEC put McWilliam in touch with an investment officer of the clean energy investment agency E+Co based in Johannesburg, South Africa to discuss project financing. McWilliam needed to provide E+Co with a comprehensive business plan to assure the financiers of the viability of his business venture. The Small Enterprise Development Agency (SEDA), and the Umsobomvu Youth Fund, through the services of a consultant, worked with McWilliam to refine the draft. Finally, E+Co's investment officer worked directly with McWilliam to ensure the business plan was ready for submission. McWilliam qualified for a loan from E+Co. When the first tranche of money was released in February 2009, McWilliam produced his first set of stoves.

Expanding the Market

Since the fuel-efficient biomass cookstove technology is not widely utilized in South Africa, a persuasive marketing strategy was necessary to have the target communities' buy-in. The target markets would need to be educated on the benefits of the technology as well as how it is used. McWilliam performed physical demonstrations of traditional cooking methods and biomass cookstove methods to potential users, clearly highlighting the differences in smoke, wood use and time. Although this method is both time-consuming and expensive, it has proved effective and is being continued with future sales agents on a commission-based model.

² McWilliam Mabaso, site visit November 2009

³ Source: Project PDD

Unfortunately, despite the numerous benefits of the technology and the substantial savings in energy costs, many schools were not able to manage the upfront cost of the cookstoves. McWilliam embarked on a strategy to achieve buy-in from the Department of Basic Education to include the technology within the NSNP, but this process is likely to take time before results are realised.

The Gold Standard

Probec and McWilliam realised that the project would not succeed if the unit cost of the stoves could not be lowered to an accessible level for the target market. E+Co's investment officer contacted an E+Carbon finance officer about McWilliam's project to assess the viability of additional financing. E+Carbon has developed two other African biomass cookstove projects and believed the project was eligible to be a Gold Standard (GS) voluntary emissions reduction (VER) project.

E+Carbon confirmed that carbon revenue could provide an additional revenue stream to the project, thus mitigating a major financing risk, and that E+Carbon could assist in realising the carbon asset. In 2008, an agreement was reached with Hewmatt and E+Carbon to become equal partners in the Gold Standard VER project; Hewmatt would develop and implement the underlying project and E+Carbon would develop the carbon finance aspects.

Since Hewmatt had already begun project implementation, E+Carbon was required to go through the Gold Standard retroactive registration process, which requires a Pre-feasibility Assessment (PFA) before the project can attempt validation. E+Co also experienced a delay in receiving the PFA⁴, after submitting the Project Design Document (PDD) and Gold Standard Passport. McWilliam assisted E+Carbon, but devoted most of his time to project implementation. However, from his relationship with E+Carbon, McWilliam learned about stakeholder consultations and the involvement of stakeholders in monitoring.

The Local Stakeholder Consultation⁵

The Local Stakeholder Consultation (LSC) is an important aspect of the Gold Standard registration process. The LSC functions to assess comments and concerns from the community members and other interested parties, which is then integrated into the Project Design Document and the Gold Standard Passport.

E+Carbon organised the LSC, which took place in February 2008 at Sihluziwe Primary School in Bronkhorstspuit. Hewmatt and E+Co introduced and explained the project to attendees, held a question and answer session and performed a sustainable development exercise to obtain feedback from stakeholders. The attendees included teachers, school principles, food programme coordinators, cooks, a representative from ProBEC and a regional NGO, ONKE, among others.

Feedback by participants, some of whom had practical experience of using the stoves, was positive and included comments around the stove's cleanliness, ease of use, and the minimal amount of smoke generated. Problems raised included the cracking of the ceramic liner and concerns over ongoing maintenance and training. Training cooks was also raised as a challenge since school cooks get rotated every six months as part of an employment programme. McWilliam found the LSC particularly useful as it provided a way to become aware of opportunities to improve both the design and marketing of his product, and to directly address concerns of the community.

⁴ The Gold Standard has since dealt with this problem of slow PFA output through increased hiring of technical staff and improved trainings.

⁵ See Annex A for sample of the comments from the Local Stakeholder Consultation

Choosing the appropriate venue for the LSC can be a challenge. E+Carbon's Catherine Diam, who helped organize the LSC, remarked that the location of the meeting meant that many of the non-community stakeholders did not attend stating, "Stakeholder consultations should be in a venue close and accessible to all parties, however this is often not possible and often this means that NGO participation is sacrificed".

The project is currently "Listed" in the Gold Standard Registry, meaning that basic project information is available to the public, and the project can now officially call itself a Gold Standard applicant.

II. Bottleneck: The Hard Work of Turning a Dream into Reality

McWilliam has come a long way since starting his efficient biomass cookstove business. At the time of writing this case study, Hewmatt has produced 177 stoves, and supplied primary schools with a safer, cleaner and less expensive way of providing learners with meals. Despite this success, the project is facing significant challenges to its ongoing viability. Stoves are not selling quickly enough to provide the volumes of carbon credits required to justify its ongoing development as a carbon project.

McWilliam has an annual sales target of 500 cookstoves, but sales are moving slower than E+Carbon anticipated due to a number of factors. The second and final tranche of funds from E+Co was released in October 2009, later than anticipated, which resulted in delays to production and the implementation of the marketing plan. The time-consuming method of marketing through demonstration requires a lot of effort for each sale, thus slowing the sales pace. If larger volumes are not ordered, then lower prices due to economies of scale cannot be gained. The high upfront costs of the stoves is the project's biggest challenge, especially since there are few financial support mechanisms available to assist the purchasers to smooth this payment over time.

Another hurdle is that Hewmatt and E+Carbon have struggled to maintain effective communication. While E+Carbon found that the use of email as a main mode of communication worked well for previous projects in Ghana and Mali, it has not been effective in the case of the South African project. McWilliam is busy and on the road most of the time, which limits his Internet access.

Unfortunately these challenges are proving difficult to address, which leaves the carbon project on hold at the time of writing this case study. The sustainable development value of the project is clear, but carbon finance demands that the project be financially sustainable.

The upfront capital cost issue: a defining challenge

Many low-income communities use energy created by expensive and dirty fuels (e.g. paraffin, wood for open fires). Communities and policymakers have little knowledge of alternatives like employing energy efficiency and renewable energy for energy service provision. Capital is a scarce resource in low-income communities, and sustainable energy interventions are not prioritised in capital allocation decisions in South Africa⁶. Though carbon finance provides an additional revenue stream to these types of projects, it does not fundamentally address the upfront capital challenge. Development finance institutions such as E+Co can thus play an important role, as can programmatic mechanisms which enable both the public and development finance sectors to bring some of these revenues forward through subsidies or soft loans.

This case study highlights the additional support that is required before the carbon market can truly provide assistance to the small scale, grassroot level sustainable energy projects, which can be drivers of such substantial sustainable development benefits to the poorest of the poor. There is still some way to go.

⁶ For further analysis of this challenge in the sub-Saharan African context see http://www.southsouthnorth.org/country_home.asp?country_id=5

III. Project perspectives from the stakeholders

Project Developer - E+CO:

E+Co is a non-profit investment agency focussing on small clean energy businesses in developing countries. It has been operational for 15 years and has offices in 8 locations internationally. E+Co have a progressive approach that combines business development support with investment capital in order to create energy businesses equipped to both mitigate climate change and generate financial returns for entrepreneurs.

Catherine Diam, part of the E+Carbon team stated, “stove projects are energy efficiency projects and also have significant “co-benefits” making Gold Standard a good fit for them”. Catherine continued, “the Gold Standard has a methodology specifically for cook stoves that is significantly better than the methodology put forth by the CDM. This is because they do their math differently, and the Gold Standard more accurately calculates offsets from cooking than the CDM.”

Local NGO: ONKE

ONKE is a Renewable Energy and Energy Efficiency NGO focusing on community education and training. They are based in Springs, Gauteng and have been operational for over 15 years. The organisation aims to educate communities on the benefits both now and into the future of using Renewable Energy and Energy Efficient cooking appliances.

ONKE has supported this project because the product is good and greatly benefits the people using it. They were impressed with the Gold Standard Local Stakeholder Consultation requirements and felt that the setting was very conducive to stakeholder interaction: in particular the use of local language and the approachable and relaxed manner of the facilitation.

According to Mmathabo Mrubata, Director of ONKE, the two biggest barriers to the project are lack of information and knowledge within the community, as well as the need of communities to see projects and products well established before confidence is built.



IV. Developing a Workshop⁷

Findings from this case study pointed to significant challenges in the underlying energy project even before the additional complexities of Gold Standard carbon project development was encountered. These findings were in line with those of a 2007 REEEP funded SouthSouthNorth Gold Standard project ([REEEP Project No. 10501005](#) – Lessons & guidance in securing financing for RE / EE projects in southern Africa through Gold Standard Carbon Revenue⁸), which highlighted the need for capacity building in the development of Business Plans as well as the need for upfront capital financing.

With this in mind, the Johannesburg workshop aimed to bring together stakeholders within the sustainable energy project development community, to explore and share, through presentations and facilitated discussion, the common challenges and successes in developing smaller community focused sustainable energy projects within the southern African region.

⁷ See the full workshop report in the document titled “South African POC Workshop Report”, which can be obtained from GS upon request

⁸ Parthan, Binu. “Building Blocks” located in the “library” section on the SouthSouthNorth homepage.< <http://www.southsouthnorth.org> >



In preparation for this workshop, Michelle du Toit organized site visits for both the Cosmo City Climate Proofing Programme of Activities (PoA) (GS823 – Energy upgrade interventions in low cost dwelling structures), and the GS652 – Dissemination of fuel-efficient biomass stoves in South Africa, the subject project for the case study.

Biomass Cookstove site visit, Bronkhorstspuit

The workshop⁹:

One hundred invitations were emailed nationally. All invitees were invited to spread the invitation to persons they thought would be interested in attending. Of those emailed 34 confirmations were received with 29 participants in actual attendance on the day. The group that attended was representative of the renewable energy and energy efficiency community and the organisers were satisfied with the turnout. An agenda of the workshop is indicated below.

Michelle du Toit introduced the workshop, giving a brief overview of The Gold Standard and background on the REEEP funded Points of Contact Programme. She highlighted the other REEEP funded case studies in the four target countries and expanded briefly on the findings from the South African project, which gave rise to the workshop. Thereafter Michelle outlined the Workshop's agenda and the objectives of the workshop, and each of the participants briefly introduced themselves and their organisations.

Presentations:

Three presentations were given by delegates during the workshop who are directly involved in developing smaller community focused sustainable energy projects in South Africa, before the brainstorming session began. Each explored a different perspective of sustainable energy project development as outlined below:

“Developing a small-scale fuel efficient biomass project in South Africa”

By McWilliam Mabaso, Director, Hewmatt Energy

Overview: McWilliam highlighted the limited resources available to him for assistance in developing a strong business plan. Furthermore his presentation shed new light on the experience of local entrepreneurs collaborating with business entities and around financing his project. McWilliam believes potential financiers have a limited knowledge of Biomass Cookstove technology and some believe that South Africa is sufficiently developed with no market for fuel-efficient cookstoves. Financers who fund renewable energy or energy efficiency technologies are often focused on megawatts savings produced by projects, which does not capture many of the additional benefits produced by these types of projects. McWilliam described the communication challenges with the three major project partners, one of which is based in a different country. In particular McWilliam experienced disparity between the expectations and objectives of the various partners involved.

⁹ See Annex B for the full Workshop Agenda

-“Cosmo City Climate Proofing Project, Challenges and Successes in Sustainable Energy Housing Projects – A Case Study”

By **Flora Mokgohloa** (Executive Director, Environmental Management, City of Johannesburg)

Flora highlighted the opportunity for the inclusion of sustainable energy design in the rollout of low-income housing units. A large solar water heating housing project in Nelson Mandela Bay is currently in development. This will provide other South African municipalities an opportunity to observe the large scale roll-out of solar water heaters which have previously only been implemented on a small or medium scale. Flora emphasized the need for effective and sustainable financial models to support large-scale rollouts.

A challenge is related to the procurement systems that they are obliged to operate under, which also do not align with the most efficient way of developing these types of projects. Specific to Gold Standard, there was not enough money for individual capacity training and it took a significant amount of effort to get all of the relevant stakeholders involved for the Local Stakeholder Consultation (LSC). However, the LSC ensured community acceptance.

“Ensuring the uptake of renewable energy and energy efficient technologies in communities”

by **Mmathabo Mrubata** (Director, ONKE Training)

ONKE Training is an NGO that seeks to empower communities and expose them to sustainable energy technologies and practices. The organization was involved in both McWilliam’s Biomass Cookstove project as well as the Cosmo City Housing Project. Mmathabo’s presentation highlighted the complexity involved in gaining community acceptance of new technologies and practices. The importance of understanding the culture and perceptions within a community is paramount. How a project is branded could make the difference between acceptance and rejection within communities as they are highly sensitive to being given lesser and inferior projects. It is imperative to continue training for households that are being introduced to the technology, as often the excitement of acquiring an appliance can hinder the uptake and understanding of training.

Outcomes

The workshop provided an open, knowledgeable space for stakeholders to share their experiences in developing smaller community focused renewable energy and energy efficiency projects. The facilitated brainstorm session gave rise to some innovative ways in which project developers could address financing issues, and sharing of common barriers and challenges, and the airing of strong views on the value / lack of value which the carbon markets and processes bring to these project types. The informal setting of the buffet lunch facilitated discussion and networking amongst stakeholders with contacts being developed and informal meetings agreed between some of the attendees. Knowledge and ‘tips’ were shared. It is hoped that ongoing meetings will result from the workshop.

It was felt to be very valuable that a member of the Gold Standard secretariat was able to attend. Both the workshop and the two site visits conveyed a greater understanding of the complexities and barriers that project developers face within the very specific southern African setting. These learnings were taken back to the Gold Standard secretariat in Geneva as well as the REEEP international secretariat.

The interest and focus of the workshop and case study in the Biomass Cookstove Project has given McWilliam renewed vigor with which to face and address the challenges he faces and he is optimistic about taking the project forward. He has initiated contact with his partners E+Carbon in the USA and hopes to increase the rollout of his stoves in the future. Since his presentation at the workshop in South Africa, McWilliam has been invited to be a session chair for Africa at the Regional Capacity Report on CDM Status for the **LOW CARBON SUMMIT (19 – 26 OCTOBER, 2011) in Dalian, China.**

The workshop established relationships between the Gold Standard and the attendees. The secretariat continues to discuss how they can increase outreach to encourage and aid small and micro-scale projects in South Africa. The Gold Standard has maintained contact with ONKE Training to potentially recruit the NGO on the roster of Gold Standard NGO Supporters. We are also working with the South African Designated National Authority (DNA) to see project development become less cumbersome and easier for project developers.

Disclaimer: *The opinions contained within this publication are the views of the authors and are not to be construed as reflecting the views of REEEP or the REEEP Donors and partners. REEEP, the REEEP donors and partners accept no responsibility or liability whatsoever with regard to the information provided by the authors.*

Interviews:

Gavin Watson, GTZ ProBEC (formerly investment officer at E+Co South Africa) – November 2009

McWilliam and Martha Mabaso, Hewmatt Energy Southern Africa – November 2009

Erik Wurster and Catherine Diam, E+Carbon – November 2009

Mkhambi Mahlangu, School principle, Bronkhorstspuit – November 2009

School Cooks, Bronkhorstspuit – November 2009

Mmathabo Mrubata, Director ONKE – March 2010

Annex A: Sample of comments from the Local Stakeholder Consultation

Stakeholder Comment	Assessment	Response to comment
Cracking of liner after only 3 weeks of use.	Cracking of liner is caused by temperature fluctuation. It affects neither lifespan nor efficiency of stove.	Cracking of liner doesn't affect lifespan or efficiency of stove. However issue can be remediated by creating space in liner at the time of manufacturing to allow ceramic to expand and retract with temperature changes. All cracked stoves will be fixed by manufacturer as part of warranty.
Stove is too heavy to be moved around.	The materials used to make the stove are necessary to maintain efficiency and durability. Most schools have an open shack that serves as a kitchen and a storage room to keep cooking equipment. Stoves have to be moved from the store room to the shack every day.	The weight of the stove cannot be altered. However, Hewmatt and ProBEC are planning to work with the department of education to build kitchens for the schools.
E+Carbon and Hewmatt should seek feedback from ProBEC's pilot project		Project sponsors are working very closely with ProBEC and are planning to use any information made available to them by ProBEC to improve their project.
On-going training of kitchen staff should be considered since cooks rotate every 6 months.	Proper training and proper use of stoves is essential to the project success.	Hewmatt plans to hire local agents to service and sell stoves. These agents will be in charge of on-going training.

Annex B: Workshop Agenda

09h30 – 09h45	Tea, Coffee and Rusks	
09h45 – 10h00	Welcome and Introduction	Michelle du Toit, Gold Standard Point of Contact
10h00 – 10h30	Developing a small-scale fuel efficient biomass project in South Africa	McWilliam Mabaso Project Developer – Hewmatt Energy
10h30 – 11h00	Developing a sustainable energy housing project – viewpoints from a Municipal Project Developer	Cosmo City Housing Project, City of Johannesburg
11h15 – 11h45	Ensuring the uptake of renewable energy and energy efficient technologies in communities	Mmathabo Mrubata ONKE (renewable energy and energy efficient household cooking NGO)
11h00– 11h15	Tea break	
11h45 – 12h45	Overview of challenges and successes, brainstorming and exploration of possible solutions	Emily Tyler, Gold Standard POC
12h45 – 13h00	Gold Standard Comment	William Theisen, Gold Standard Secretariat
13h00	Lunch	

Annex C: Outcomes from the brainstorm session

A discussion and brainstorm session facilitated by Emily Tyler aimed to identify and share common challenges, successes and solutions within the sector. Discussion was lively and concentrated on financing and funding challenges, capacity gaps in business development and management, the value of the CDM and GS processes, and validation and verification hurdles. Points were written up on a flipchart and have been transcribed below, please note that subject does not necessarily align the rows.

Successes	Challenges	Solutions / way forward
On-going project monitoring reveals benefits over the lifetime of the project	Understanding government departments and their ways of working, particularly bearing with delays, and understanding how to access the right people.	There is potential to utilize government subsidies e.g. REFSO, DTI subsidies, however engagement is needed regarding project size requirements and administrative complexity, which tend not to cater for very small projects.
Substantial community benefits do result from these projects – the returns are not solely financial, but should be recognized as successes.	[Silo thinking related to Energy.] Lack of cross-communication and consideration of various renewable energy and sustainable energy interventions in energy service delivery	Combining subsidies from Department of Human Settlements and Department of Energy. A working group within government is currently starting to look at this.
Linking smaller community focused Gold Standard projects with larger commercial Gold Standard projects to enable cross-subsidisation of credit revenues	Sustainable energy projects typically require up-front equity finance, and the carbon markets typically deliver debt finance at best. This is problematic where there are few other sources of equity finance available to project developers.	The Free Basic Energy Grant may offer a potential ongoing revenue source to smaller energy service provision projects, and should be investigated.
Carbon finance can be used to cover monitoring and maintenance, as opposed to upfront capital costs, which is very necessary in some sustainable energy projects	Development of business plans, financial modeling and business skills.	Dialogue on a national level could unlock some cross-departmental thinking and application of resources.
	In particular, there is a cost and time lag associated with utilizing Designated Operational Entities. Project developers have experienced prohibitive expense associated with international verification and lack of local knowledge by international verifiers.	Cities can (and do) set their own standards – many of them recognize the need to build resilience in communities. They value the development of sustainable livelihoods and settlements in 'real' terms.
	Effects of the recession and a risk averse market, and uncertainty around CDM post 2012 all have negatively effected the uptake of the CDM and GS in Southern Africa.	Energy Efficiency tax incentives may provide a revenue stream for projects.
	There is a disconnect between community practitioners and financiers. This gap needs to be bridged.	Standards and certifications are important to generate assurance and acceptance of technology. This is particularly important if government is to endorse a new sustainable energy technology.
	Lack of capital available to project developers. There has been a disparity between 'promises' & actuality – both in relation to debt finance and equity finance	Develop alternatives to requiring the measurement of energy efficiency and renewable energy in kWh alone. This is particularly relevant with regards to cooking.
	Africa perceived a high-risk investment destination.	Financial planning and business plan development training.
	Time delays both relating to the CDM / GS processes, and to securing funding from the public sector (government and aid / donor finance)	Scale-up of pilot projects spear headed by cities may lead the way.