

DEVELOPMENT OF

CLEAN DEVELOPMENT

MECHANISM PROJECTS IN

TANZANIA

BY GREEN RESOURCES AS

LESSONS LEARNT

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LIST OF ACRONYMS

AAC: Annual Allowable Cut (m³/year)

CDM: Clean Development Mechanism

CERs: Certified Emission Reduction units (tons of CO_{2eq})

DNA: Designated National Authority

DOE: Designated Operational Entity under the UNFCCC

EB: Executive Board of the UNFCCC

ESIA: Environmental and Social Impact Assessment

EWURA: The Tanzania Energy and Water Regulatory Authority

FSC: Forest Stewardship Council

GHG: Greenhouse gases

GRAS: Green Resources AS

GRL: Green Resources Ltd, Tanzania

LoA: Letter of Approval from the DNA

LoNO: Letter of No Objection from the DNA

MFA: Ministry of Finance, Norway

MKUKUTA: Tanzania National Strategy for Growth and Reduction of Poverty

NEMC: National Environmental Management Council of Tanzania

PDD: Project Design Document

PIN: Project Identification Note

RNE: Royal Norwegian Embassy

SHE: Sao Hill Energy Ltd, Tanzania

SHI: Sao Hill Industries Ltd, Tanzania

TANESCO: Tanzania Electric Supply Co. Ltd

UNFCCC: United Nations Framework Convention on Climate Change

VCS: Voluntary Carbon Standards



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1.0 Summary

In March 2008, Green Resources AS of Norway (GRAS), Registration No. 975 879 962, received financial support from the Royal Norwegian Embassy of Dar es Salaam (RNE) to conduct studies on the possibility of developing two Clean Development Mechanism (CDM) projects in Mafinga, Mufindi District, Iringa Region, Tanzania. The total amount not exceeding 1 209 335 NOK, was meant to partly finance the studies in the period 2008-2009 pursuing the following objectives:

1. To assess the feasibility and social and environmental impacts of developing two projects '2MW and 10MW Combined Heat Power (CHP) plants' at Mufindi District, Iringa Region, Tanzania,
2. To carry out environmental impact assessments (EIAs) of the CHP projects.
3. To prepare the necessary Project Design Documents (PDDs) for these projects in accordance with the rules and guidelines of the CDM Executive Board (EB),
4. To assess the feasibility and environmental impacts of developing a 'sawdust briquette project' as CDM project,

Following a number of studies and actual accomplishment of work, GRAS would like to publicly share the following lessons learnt throughout the process.

2.0 Overview of Green Resources AS

Green Resources AS (GRAS) was established in 1995 as a private Norwegian company with Norwegian organisation number 975 879 968, and is head quartered at Strandveien 35, 1366 Lysaker, Norway. GRAS is a plantation, carbon offset, forest products and renewable energy company. It employs more than 3,000 people and has invested NOK 300mn (USD 55mn) in its African operations since its inception. GRAS operates in Tanzania, Uganda, Mozambique, and Sudan. More information about the company is found at www.greenresources.no.

The company is Africa's leading forestation company and has more than 14,000 ha of forest. It is growing trees to generate carbon credits and bio-energy and to manufacture wood products. Green Resources' has probably planted more new trees than any other private company in Africa during the past ten years; a record 4,200 ha of new forest was planted in 2008. It started the first harvest from its own forest in 2008 at the Uchindile Forest Project of Green Resources Ltd (GRL), Tanzania.

Green Resources' carbon credit projects include forestation, bio-energy and renewable electricity. It is a leader in forestry derived greenhouse gas (GHG) emission reductions and received the first verified carbon credits in 2000. In July 2009, the Mapanda/Uchindile forest project, part of GRL, was the first such project in the world outside of the US to receive VCS validation, the leading standard for voluntary carbon projects. The project is expected to generate 3.5mn tCO₂ offsets through 2020. All Green Resources' carbon offset revenues will be reinvested in new carbon offset activities or be used for community developments in Africa, making the credits some of the most attractive in the world.

Green Resources' strategy is based on sustainable development of the areas in which it operates. The company believes that forestation is one of the most efficient ways of developing and improving social and economic conditions for people in rural areas. It aims to



be the preferred partner for local communities in these areas, and to be the favoured African employer within its industry.

Green Resources' aims to follow the highest international environmental standards by conserving natural forest and other valuable habitats. The oldest forest is certified according to the Forest Stewardship Council's (FSC) standards, the world's leading standard for environmental and sustainable forest management, and all forest will be certified according to these standards. As part of this policy, the company only harvests plantation forest, plants at least ten new trees for every one tree that it harvests, and only plants on grassland or degraded forestland. It focuses on a wide variety of species, including pine, eucalyptus, teak, measopsis and various indigenous trees.

Green Resources' industrial operation in Tanzania, Sao Hill Industries (SHI), is East Africa's largest sawmill and one of the largest transmission pole producers in the region; it also runs carpentry and joinery plants.

The renewable energy projects of GRAS are developed in Tanzania under Sao Hill Energy Ltd (SHE), established in June 2008. Potential projects in the southern highlands include the utilization of wood waste to produce renewable energy and steam through Combined Heat Power (CHP) technology; production of charcoal and wood briquettes from sawmilling waste; small to medium hydropower projects and medium wind power projects.

3.0 Project Background

3.1 Primary energy sources as a major cause of deforestation

Deforestation is a serious problem in Africa, accounting for about 55% (4 million hectares) of the annual global forest loss. Globally, the impact of deforestation through burning is estimated to contribute 20% of the recent rise in carbon dioxide emissions in the atmosphere. In Tanzania and Uganda 15% and 25% respectively of forest has been lost since 1990. Presently, the majority of Tanzanians rely on firewood and/or charcoal from natural forest to provide primary energy for cooking, heating and lighting. This is a leading cause of deforestation of natural forest in the country.

3.2 Availability of Wood Residues in Mufindi District – Opportunities for CDM projects

The Southern Highlands are located in the South western part of Tanzania, predominantly in Mufindi District, Iringa region. This is the area where Green Resources' operates its' industrial operations of sawmilling and poles production under Sao Hill Industries Ltd. (SHI), as well as afforestation activities under Green Resources Ltd (GRL).

Through a study conducted by GRAS in 2009 on wood and biomass availability in the Southern Highlands, it was concluded that there is currently more than 350,000m³/year of forest and sawmill residues available in the area, the amount growing to more than 420,000m³/year by 2015.

3.2.1 Forest Residues

The Sao Hill Forest Plantation (SHFP), located in the southern highlands, is the largest forest plantation in East Africa, established by the Tanzanian government in the early 70s to the 90s, and is managed through the Ministry of Natural Resources and Tourism under the Forestry and Beekeeping division. It was established as a forest reserve area occupying approximately 65,000 ha and the total planted area is 41,604 ha. About 85% of the forest is pine, mostly



pinus patula, but also some elliottii and a smaller volume of carebea. About 15% of the forest is eucalyptus, mostly grandis and saligna.

The main source of wood for Sao Hill Industries' sawmill operations and other small saw-millers in the district as well as the Mufindi Paper Mill (MPM) is the SHFP with a total annual allowable cut (AAC) of 1 million m³. During the nineties and the first half of the decade, only about half of the annual harvest was logged, while in recent years, about ¾ of the AAC has been harvested.

The overall industrial utilization of the wood harvest in Mufindi district is estimated at 30% or below (i.e. total waste amounts to 70% of the total harvested products). Firewood, including the wood used by surrounding tea factories, the wood used in the boilers of MPM and private uses, may account for up to 10% of the annual harvest. The remaining 60% of the harvested wood is wasted, burnt or left to rot. This includes all sawdust and virtually all slabs from the saw mills, and crooked, out-sized and decaying logs in the harvested areas.

In addition, there is the harvesting waste, including branches, tree tops, etc which is not included in the basis for the calculation of the harvested wood. This accounts for an additional 15% of the total biomass.

Green Resources' aims to utilize all the residues left in the forest and convert them to renewable energy through a new small scale renewable energy 15MWe CHP plant which will utilize approximately 212,000m³/year of biomass mix (forest residues, branches, tops, sawmill slabs, and other sawmill residues). This is the first CDM potential renewable energy project under this report.

3.2.2 Own source of forest residues

Green Resources Limited (GRL) is the main planting company of GRAS for the Tanzanian Southern Highlands operations. GRL started planting eucalyptus and pine in 1997, in areas located 70 – 120 km from SHI area. High thinning has taken place in the eucalyptus forest with the objective of extracting all available poles during 2009-11, followed by final felling in 2012 and 2013. Thinning will also take place in the pine forest.

Thinning available from GRL plantations is shown below. It has been assumed that 40% of the thinning can be recovered as forest residues. Out of this residue flow Pine thinning is planned to be used as biomass fuel in a CHP plant, while thinning from eucalyptus will be used for charcoal and charcoal briquetting.

GRL Plantation Thinning, solid m3/year	2012	2013	2014	2015	2016	2017
Eucalyptus	20,932	19,760	13,531	13,365	34,015	57,092
Pine thinning	11,069	14,290	12,990	14,858	23,162	46,600
GRL total	32,001	34,050	26,521	28,223	57,177	103,692
of which Forest Residues						
Eucalyptus	8,373	7,904	5,412	5,346	13,606	22,837
Pine thinning	4,428	5,716	5,196	5,943	9,265	18,640
Sub-total available Residues from GRL Forest	12,800	13,620	10,608	11,289	22,871	41,477

3.2.3 Sawmill Residues

Many small to medium scale saw mills generate large amounts of surplus wood residues in the form of sawdust, off-cuts, and slabs. In many cases, as at Sao Hill, the surplus residues are disposed of as large stockpiles at the sawmill sites. The stockpiles occupy a lot of space and pollute the local environment. The decomposition process can be followed by spontaneous



combustion of the sawdust, presenting a severe fire risk. The decay of these stockpiled wet residues leads to emissions of methane, a potent GHG potentially contributing to climate change.

At Sao Hill Industries, which is a large saw mill, part of the residues will be used to generate renewable energy using a CHP generation technology. The rest of the sawmill residues are used for charcoal production and additional planned for production of sawdust/charcoal briquettes. Currently there are estimated 160,000m³/year of sawmill residues generated in the southern highlands area (including those produced at SHI). This is the second main CDM potential project under this study.



Figure: Heaps of end-cuts and sawdust at SHI disposed at the site

4.0 Project Objective

The main objectives of the project are therefore to develop CDM projects in Mufindi District through:

- i. Utilization of forest residues from harvesting sites and sawmill residues from the sawmill operations to generate clean, renewable energy electricity through a new 15MWe CHP facility. In order to accomplish this, Green Resources' undertook necessary studies to assess the feasibility of developing two projects "2 MW CHP, Iringa district, Tanzania" and "10 MW CHP, Iringa district, Tanzania" as CDM projects; to prepare the necessary Project Design Documents (PDDs) for such projects in accordance with the rules and guidelines of the CDM Executive Board (EB); and to carry out Social and Environmental Impact Assessments (SEIA) of each.
- ii. Avoidance of negative environmental impacts of saw mill residue handling by producing charcoal and saw dust briquettes, which are clean renewable energy bio-products. Green Resources' undertook necessary studies to assess developing a charcoal and saw dust briquette project as a CDM project.

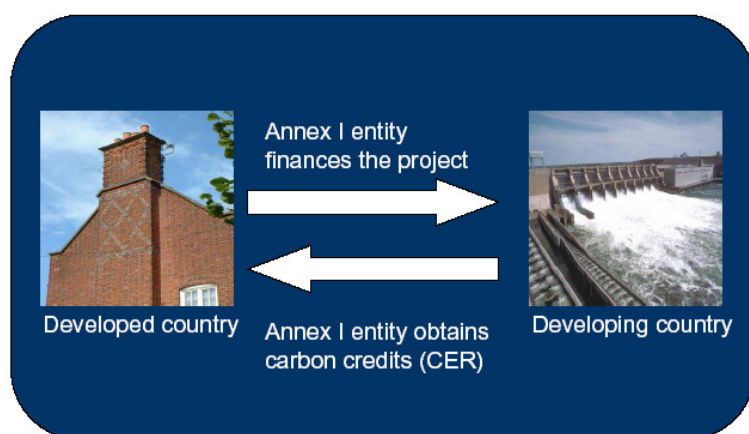


5.0 Development of CDM projects in Tanzania

5.1 The UNFCCC and the CDM Market

Under the UNFCCC Kyoto Protocol, Clean Development Mechanisms (CDM) projects that reduce emissions or remove carbon dioxide from the atmosphere generate Certified Emission Reductions (CERs). The purpose of CDM is to provide support to Non-Annex I Parties in achieving sustainable development through the implementation of project activities and to contribute to the ultimate objective of the UNFCCC, and at the same time, to assist Annex I Parties in meeting their GHG emission reduction commitments.

The CDM project developer receives CERs after the project has successfully undergone the project cycle for CDM. The developer then sells the CERs to an operator i.e. a company or a government (Annex I entity) that requires additional CERs or EU Allowances (EUA) under the EU Emission Trading Scheme (ETS) trade and cap agreement. The operator can then request the conversion of the CERs into the corresponding amount of EUAs through an International Transaction Log.



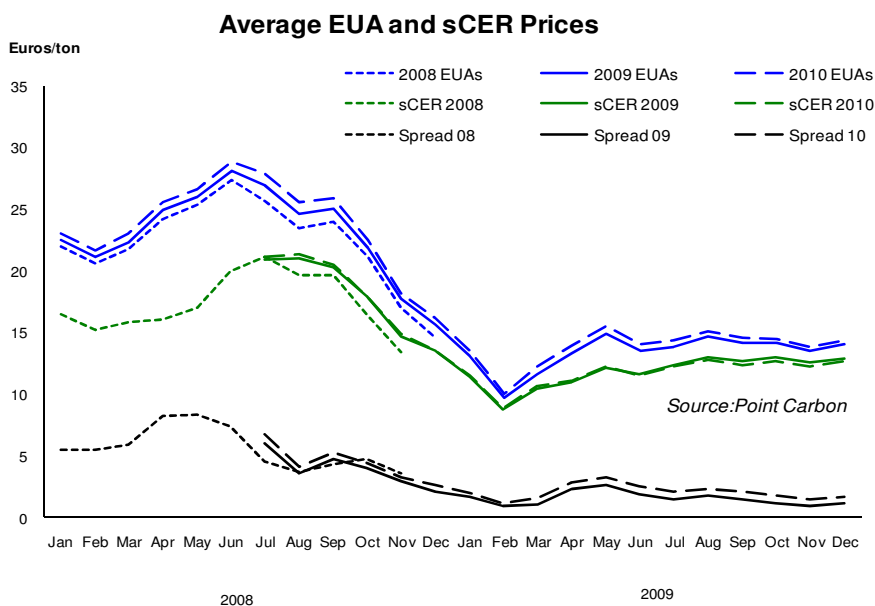
Examples of CDM projects include Energy industries (renewable/ non-renewable), forestry, agriculture, waste handling and disposal, etc.

Trading in carbon credits is a large and growing market, where the global carbon market for transactions was worth Euro 94million in 2009, which is more than double of the 2007 figures. Growth was driven by higher prices and increased transactions; attributed to the start of the Phase II of EU Emission Trading Scheme (ETS) in January 2008 and to the launch of secondary CER contracts trading on the European Climate Exchange (ECX). The table below shows market figures between 2005, 2007 and 2009.

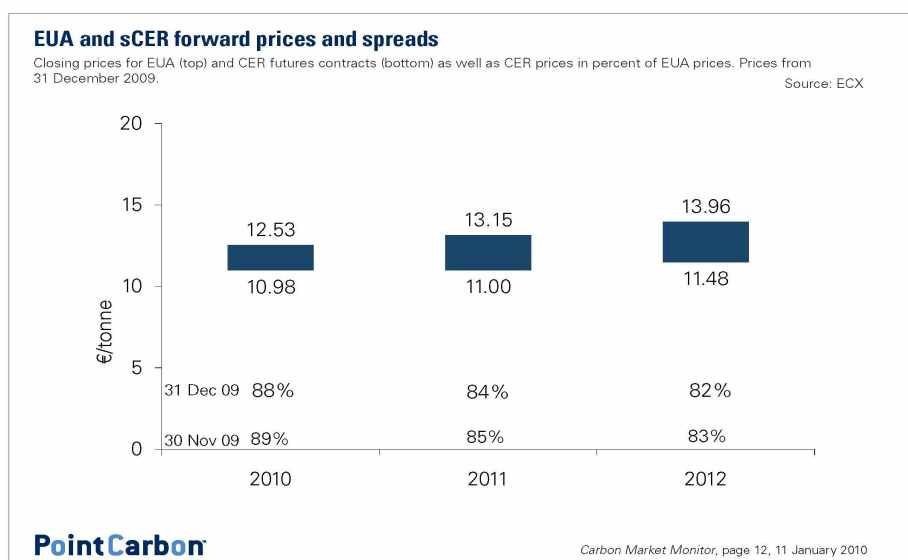
	2005		2007		2009	
	Mt	€m	Mt	€m	Mt	€m
EU ETS	362	7,218	1,643	28,133	5,646	72,758
Primary CDM	397	1,985	597	5,984	304	2,548
Secondary CDM	4	50	350	5,753	1,286	14,972
JI	28	96	38	326	44	399
ARI					138	1,379
RGGI					765	1,773
Other	8	52	48	186	75	284
Sum	799	9,401	2,676	40,382	8,258	94,113



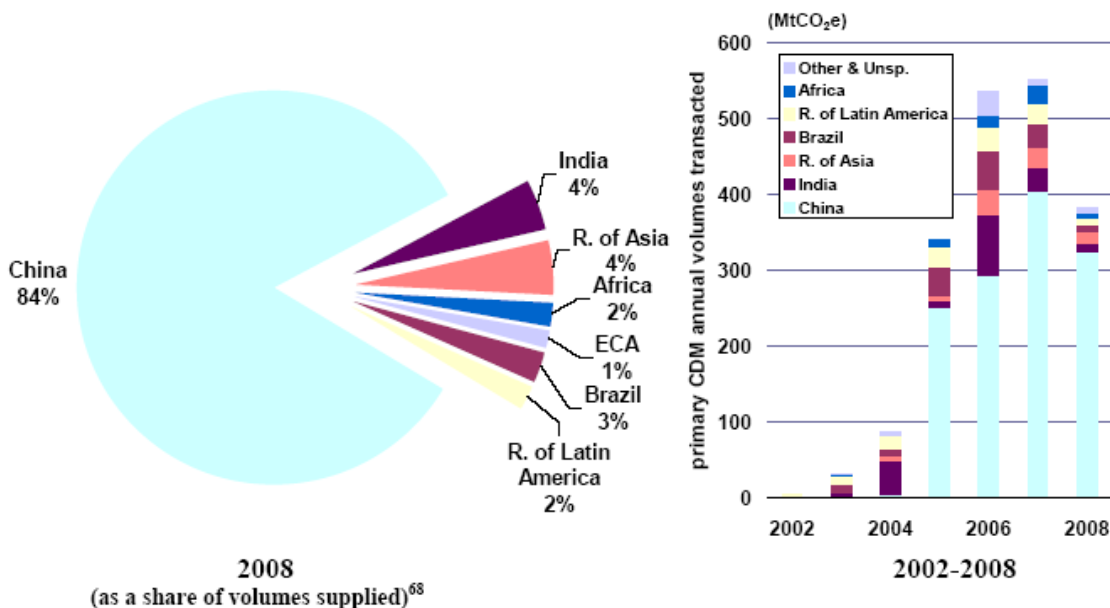
Price forecasts for carbon credits are summarized below:



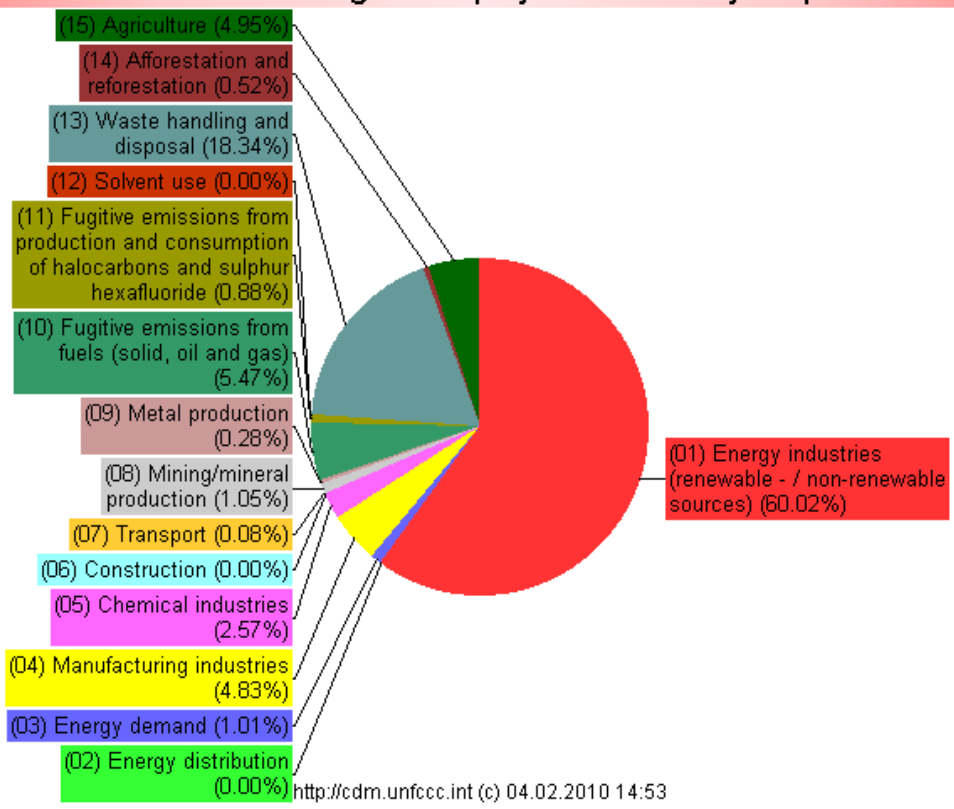
While future prices according to Point Carbon Market Monitor report (January 2010) are:



Total registered CDM projects by end of January, 2010 are 2,032 out of which 60% are energy projects – See figure below. Total issued CERs are 342million, expected to rise to >1.73billion by end of 2012. Only 1.85% of all registered CDM projects are from Africa. Tanzania has one CDM approved land-fill gas recovery project.



Distribution of registered project activities by scope



5.2 Contribution of CDM to Tanzania

The purpose of CDM is to provide support to Non-Annex I Parties (such as Tanzania) in achieving sustainable development through the implementation of project activities and to contribute to the ultimate objective of the UNFCCC. CDM activities will therefore attract capital investment to Tanzania. Main benefits that can be realized from CDM activities include: Sustainable industrial development, Poverty reduction through improved and



increased rural income, employment opportunities to the communities, availability of affordable energy sources to the rural communities, improvement of social services such as education, health, etc., as well as enhancement of technology transfer and development.

The Tanzania CDM guide for investors provides a list of the ‘Approved interim CDM projects that can apply in Tanzania’, the first one being ‘renewable energy project activities with maximum output of up to 15MWe’.

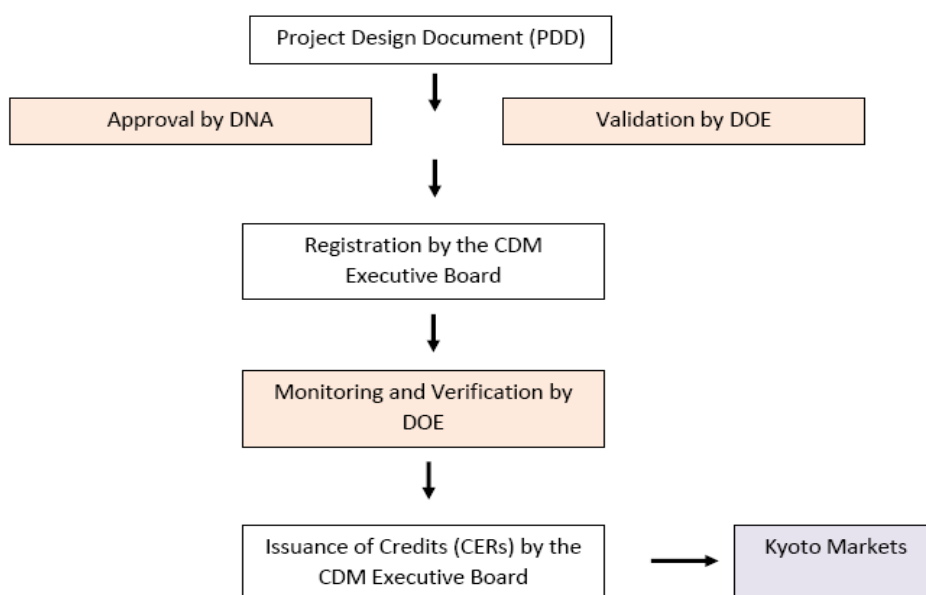
The following are among the sustainable development criteria for CDM acceptability in Tanzania:

- Compatibility with national sustainable development including, ecological and social dimensions;
- Consistency with the national agenda on poverty eradication;
- Congruence with the national environmental policy and related action plans and strategies;
- All CDM activities require Special and Specific EIA, consistent with the national EIA guidelines and procedures and the national environmental legislation;
- Energy projects particularly in rural areas are accorded the highest priority;
- There must be a partnership between investor country company and the host country local private company, NGO, Research /Academic Institutions or government.

The DNA of Tanzania is the Vice President’s Office, Division of Environment. The DNA is responsible for certifying that the project contributes to the sustainable development goals and meets the national development priorities of Tanzania, by coordinating the agencies responsible for setting suitability policies, environmental and investment regulations, and the organizations involved in CDM project development. This takes place in the form of a letter stating approval of the CDM project.

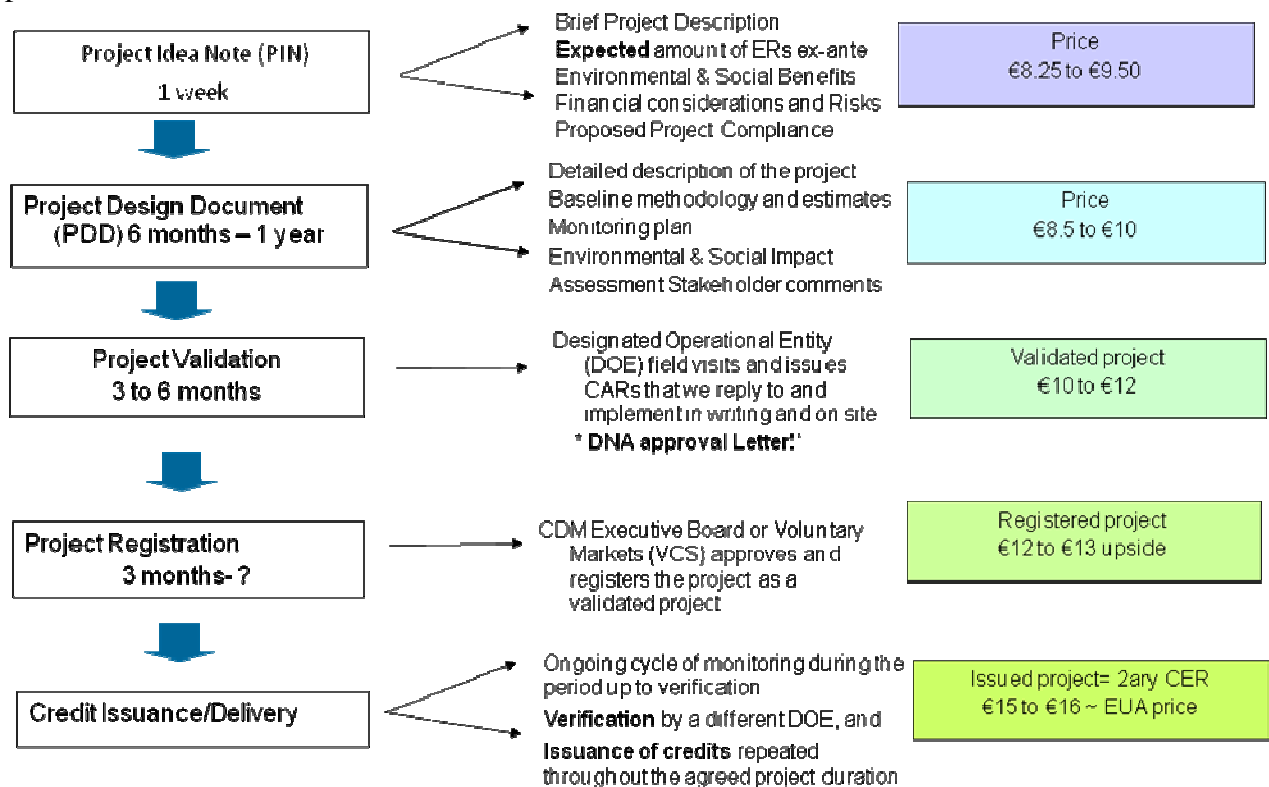
5.3. CDM Project Cycle (Simplified)

Prior to writing a PDD, a PIN may be written and submitted to the DNA for a letter of no objection (LoNO).





The project cycle below shows the estimated duration at each stage and the indicative 2009 prices for CERs.



As noted from the above, the road to project registration is long, expensive, cumbersome and difficult for most of the developing world.

6.0 Green Resources' CHP generation facility - CDM Project

With so much available wood residues, and a growing, potential CDM market, Green Resources' decided to invest in a new 'small scale renewable energy' 15MWe CHP. The plan is to sell up to 10MW of the power to the Tanzania Electric Supply Co. Ltd (TANESCO) main grid. The base load in Tanzania is an energy mix of hydro power, natural gas and diesel/HFO. GRAS calculated the grid emission factor for Tanzania as **0.586 tCO₂/MWh**.



Under Sectoral Scope 1: Energy Industries (renewable- non renewable sources), Type I – Renewable Energy Projects, the applicable two approved CDM methodologies to this project are AMS 1C: 'Thermal energy production with or without electricity' and AMS ID: 'Grid connected renewable electricity generation'. In 2008, a PIN was prepared and submitted to the DNA for a LoNO. This is still pending.



6.1 PDD Development – Lessons Learnt

In the process of creating a PDD (Project Design Document) for the CHP project, several challenges presented themselves and lessons were learned:

6.1.1 Selection of appropriate applicable methodologies

This is an important first step towards writing a PDD. The limit of CDM renewable energy projects that can use the simplified small scale PDD methodology is 15MW_{electric} or 45MW_{thermal} capacity from one project owner in one site. For the CHP project, the following methodologies were applied from Sectoral Scope 1: Energy Industries (renewable – non renewable sources). Type I: Renewable Energy Projects. AMS I.C: '*Thermal Energy generation with or without electricity*' and AMS I.D.: '*Grid connected renewable electricity generation*'.

Lessons learnt: Tanzania lacks the experience in developing such PDDs. The process is long and complicated, and needs a thorough understanding of the different methodologies before applying them to a specific project. Hiring external consulting is expensive and therefore limits the development of such projects. In the case of the GRAS project, the PDD was developed by Energy Changes of Austria at the cost of EUR 30,000.

6.1.2 Calculating the Grid Emission Factor for Tanzania

The national combined margin grid emission factor (GEF) is used as the basis for calculating Emission Reductions (ERs) based on the applicable methodologies. In GRAS case, the GEF was calculated as per guideline in the *Simple Adjusted OM*. The calculations require information on hourly generation data over a three year period (in this case 2006, 2007 and 2008) from TANESCO.

Lessons learnt: While the AMS I.C methodology provides a '*Tool for calculating the grid emission factor*', this requires extensive knowledge on how to apply the data and the formulae. GRAS calculated a Tanzania GEF of **0.586** tCO₂/MWh (compared to 0.50 tCO₂/MWh as published by the UNEP RISØE). Using this factor, the 15MW CHP project will generate an estimated 378,943.2 tons of CO_{2eq.} (CERs) over a seven year crediting period.

6.1.3 Demonstrating Additionality

According to the simplified modalities and procedures for small scale CDM project activities, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: Investment, Technological, Prevailing Practice such as existing regulatory or policy requirements, or Other barriers such as managerial, institutional, finance, etc.

According to the CDM EB 35 report Annex 34, **Non-binding best practice examples to demonstrate additionality for small scale project activities** the **Access-to-finance barrier**: is defined as: '*the project activity could not access appropriate capital without consideration of the CDM revenues*'. Best practice examples include but are not limited to, the demonstration of limited access to capital in the absence of the CDM, such as a statement from the financing bank that the revenues from the CDM are critical in the approval of a loan.

Lessons learnt: The limit for CDM financing is a profitability not exceeding 15%, which may limit the development of new small scale renewable energy projects in developing countries such as Tanzania. The structure of development of small power projects in Tanzania, with an export capacity not exceeding 10MWe to the main grid, is based on a tariff structure that is regulated and annually revised by the Energy and Water Regulatory Authority



(EWURA). The tariff paid to developers is in Tanzanian Shillings, while project financing is in a large part through foreign loans. This is an additional risk to the development of a project. For the Green Resources' CHP project, carbon financing will provide the additional funds needed to make the project viable. The International Finance Corporation (IFC) is providing loan financing to the proposed project, with the condition that revenues from CDM are critical in the approval of financing.

6.2. Demonstrating Contribution of project towards sustainable development

According to the ESIA, the proposed CHP project will produce positive environmental, economic and social benefits through the following ways:

1. **Social well-being:** i) The project will provide 500 jobs during construction, and 50 permanent positions during project implementation both in the form of skilled and unskilled labour. ii) The project will give first priority to the surrounding village communities for both skilled and unskilled workers. iii) Through implementation of the project, there will be increased opportunities to education from primary to college, better health facilities, and other social services.
2. **Economic well-being:** The project i) will improve the stability and reliability of electricity supply in the national grid as per the recently (November 2008) Government of Tanzania approved guidelines for promotion of development of renewable energy and co-generation power projects by Small Power Producers (SPPs) in Tanzania with an export capacity to the main grid of up to 10MW, ii) will purchase 17 – 19,000m³ per year wood residues from small saw mills in the surrounding communities. This waste would have otherwise be landfilled or burnt. This will have a positive effect on small business activity in the region, iii) will provide employment offering a better salary scale than the Government, assuring workers of better income, iv) The new power plant will improve the existing production at SHI and facilitate the development of new industrial operations.
3. **Environmental well-being:** i) Contribute to global environmental protection by reducing GHG emissions through the use of renewable energy, ii) avoidance of thermally generated fossil fuel (mix fuel) fired power by optimizing the use of natural resources through clean technology that avoids emissions of harmful gases or effluents hence reduction of GHG emissions, ii) Avoidance of methane emissions from decaying of wood waste in the landfill as a result of utilization of the wood residues from timber production in renewable energy production, iii) Solid waste generated in a biomass based CHP plant is boiler ash and fly ash from electrostatic precipitator. Wood ash is non-toxic and suitable to be taken to the SHI landfill or used in road construction or as forest fertilizer, iv) Air emissions and water effluent of the CHP plant will comply with the Tanzanian requirements and the IFC guidelines.

Lessons Learnt: Sustainable development is not only about profit, but also people, the communities and the planet = optimized economic, social and environmental performance. The project is in line with the National Strategy for Growth and Reduction of Poverty (MKUKUTA).

6.3 Other lessons learnt from the CDM process

Aside from development of a PDD, other notable lessons were learnt including:

6.3.1 Background Studies

In May – June 2008, GRAS engaged a Swedish company, DAPROMA AS to conduct a fibre study of the southern highlands. To complement this study, GRAS conducted a further



analysis of the amount of wood biomass availability in the Southern Highlands. Results from these two studies, show the potential for developing a small scale CDM project, which limits the generation capacity at 15MWe.

In November 2008 – April 2009, an ESIA for the proposed CHP project was conducted according to the national environmental guidelines and the CDM guidelines. It was the opinion of the experts that the project will not have any irreversible negative impacts to the environment, and an EIA certificate was awarded in November 2009.

GRAS then decided to invest in a new plant based on the findings from these studies. The project will be developed through Sao Hill Energy Ltd, a Tanzanian company, fully owned by GRAS. The International Finance Corporation (IFC) is partly financing the project through a loan, with the condition that revenues from CDM are critical in the approval of financing.

Lessons learnt: Prior to starting a CDM project, it is important to gather as much information as possible to ensure that once a project has started, it will contribute to long term sustainable development in the host country. In this case, the wood supply chain has to be in place, project financing has to be in place, sales of electricity has to be reliable, strong project management and experienced staff is equally important.

6.3.2 Process towards Project Approval

As shown in the Project Cycle, once a PDD is completed, the job of the Designated Operational Entity (DOE) begins. Operational entities are domestic or international entities accredited by the CDM Executive Board to conduct validation of projects, verification and certification of ERs, to maintain a list of CDM project activities and to make public information about CDM projects unless deemed confidential by project participants. Green Resources' has contacted Tuv Nörd, a German DOE to validate the PDD. The minimum cost of validation is not less than EURO 15 000.

Country approval or letter of approval (LoA) by country DNA is a pre-requisite to final project registration. It should be noted that currently, there is only one landfill gas recovery registered CDM project in Tanzania. The good news for companies such as Green Resources' is that renewable energy projects with generation capacity not exceeding 15MWe are highly encouraged in Tanzania as CDM projects.

Lessons learnt: i) DOEs are very few considering the enormity of the CDM projects. Secondly, they are only allowed to validate certain sectors, and therefore finding a DOE for the energy sector, with a slot of time is difficult. Most likely, a DOE will give even up to six months before they can be available to validate a project. The cost is prohibitive for most companies in the developing world, and therefore buyers or financiers may pay for this additional cost in exchange for the CERs, ii) With only one registered CDM project in Tanzania, it can be concluded that Tanzania has very little experience of this type of projects, iii) While GRAS submitted a PIN for the CHP project in 2008, a 'letter of no objection' (LoNO) from the DNA has yet been obtained. This shows slowness in speeding up the growth of similar projects in the country. iv) Tanzania has not submitted the national grid emission factor to the UNFCCC, so this needs to be calculated by a project developer and monitored as guided by the AMS I.C methodology and the '*Tool to calculate the emission factor for an electricity system*'. Since the sources for power generation change each year (energy mix of hydropower, gas and diesel/HFO), monitoring of the calculations will have to be done every year to justify or re-calculate the estimated CERs. v) It is important for a country to develop a CDM guide that promotes projects that are practically applicable and provide long term sustainable benefits to Africa.



6.3.3 Process towards Looking for Buyers and Price Negotiations

It is expected that the CHP plant will produce an average of 54,135 tons of CERs per year over the first seven years crediting period (2012 to 2019). Preliminary discussions with carbon credit buyers started in January 2009 with an objective to reach an agreement for the sale of all carbon credits generated through 2020. But Who are the buyers? How does a project developer enter the Carbon Markets? Can a project developer receive payments before project completion? How does a developer negotiate for the right price? What is the right price according to the project type? These are some of the few challenges which Green Resources' faced when looking for buyers.

The terms for negotiations for Green Resources' were based on the fact that there will be three seven years crediting periods, and the first sale will constitute credits generated in the first crediting period with a project start date of January 2010; The Purchaser shall pay up front for CERs corresponding to twenty five (25) percent of the CERs generated by the Project during the first crediting period. The up-front payment shall be disbursed by 50% upon receiving a Letter of Approval from the Host Country, and a validated PDD and the remaining 50% upon the Project being registered as a CDM project activity by the CDM Executive Board.

Lessons learnt: i) It is important to get a PDD validated and it is equally important a project is approved by the country DNA. The value of the CERs becomes infinitely much more and increases the negotiating power for the project developer. ii) Securing buyers who are willing to: a) pay for the real value of a project, b) provide up-front payment, c) consider security against up-front payments based on an African insurance firm/ bank, etc. is not an easy process, and requires knowledge of the markets, prices, buyers, need for type of project, etc. iii) In addition, the process of project financing is not easy, it is long, and may involve brokers, a process which may confuse project developers, or even be a barrier to the process towards developing a CDM project.

6.3.4 Process towards Project Monitoring

Project Monitoring is very important in order to ensure the sustainability of the project. It should be noted that the project will need to be re-validated occasionally. As an example, the simple operating margin, national grid emission factor, net calorific values of the fuel source, and a number of other calculations/assumptions/figures etc. will need to be monitored throughout the lifetime of the project in order to make this a successful CDM project.

Lessons learnt: While monitoring is important, it may turn out to be an expensive process and require full time expertise of a person with good knowledge of the CDM Tools and Methodologies. The advantage of the process is that capacity is built within the organization each year. And this knowledge can be transferred and shared with other project developers in the country.

7.0 Green Resources Wood Residues to Briquettes Project – a CDM opportunity

Stockpiles left at sawmill sites at SHI and other small sawmillers in surrounding areas, are normally large, occupy a lot of space and pollute the local environment. The decomposition process can be followed by spontaneous combustion of the sawdust, presenting a severe fire risk. The decay of these stockpiled wet residues leads to emissions of methane, a potent GHG potentially contributing to climate change.



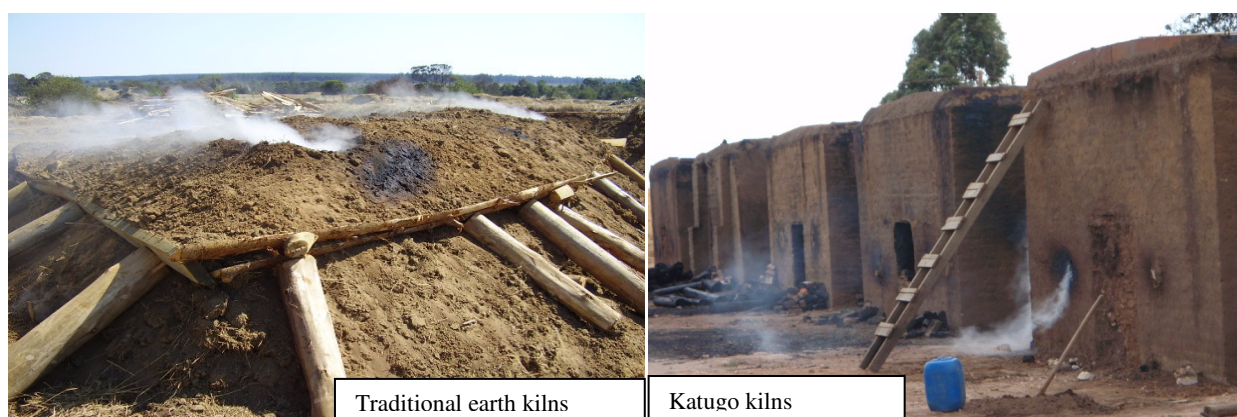
The main project idea was to avoid negative environmental impacts of residue handling by producing wood briquettes, which are dried and compressed to small modules of solid fuel. Both Charcoal and Wood briquettes are a clean and renewable fuel. Since produced from wood, a renewable biomass, their combustion is considered carbon neutral and does not result in emissions. Due to the high prices of fossil fuels, the introduction in the domestic market of a renewable fuel has high market potential such as the replacement of mineral coal, Heavy Fuel Oils (HFO), Diesel in industries and/or electricity production.

Green Resources' bought a fully automated briquetting factory in India in October 2009 and will be operational by March 2010 following an environmental impact assessment report. The factory has the capacity to produce 3,600tons of briquettes per year.

The project is eligible to obtain carbon credits under the CDM for drying of residues to avoid methane emissions and the combustion of the produced fuel reduces emissions by replacing fossil fuels. Development of a PDD for the project is possible using an approved small scale applicable methodology, AMS. III.E for '*Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical thermal treatment*'. However, Green Resources' did not go further to this stage as it requires expertise and knowledge on applicability of the methodologies and establishing a proper monitoring plan.

Wood waste to Charcoal: A modernized and up-graded charcoal kiln project, using the Katugo technology from Uganda, was developed by Green Resources' in 2008. The kilns are cheap to build, but have twice the yield of normal 'earth kilns' where 98% of all East African charcoal is produced.

The charcoal production utilizes the trimmings from transmission poles production, lops and tops at SHI, thus reducing negative environmental impacts from waste piles, while producing an alternative energy resource. There are currently 12 'Katugo' kilns at Sao Hill based on an improved technology, with an annual capacity exceeding 2,000 tons per year. Each kiln produces about 8 tons per charge every 14 days or 200tons/year. The yield is in excess of 30%, which is more than twice the typical recovery from traditional earth kilns. So, the environmental benefits are very high.



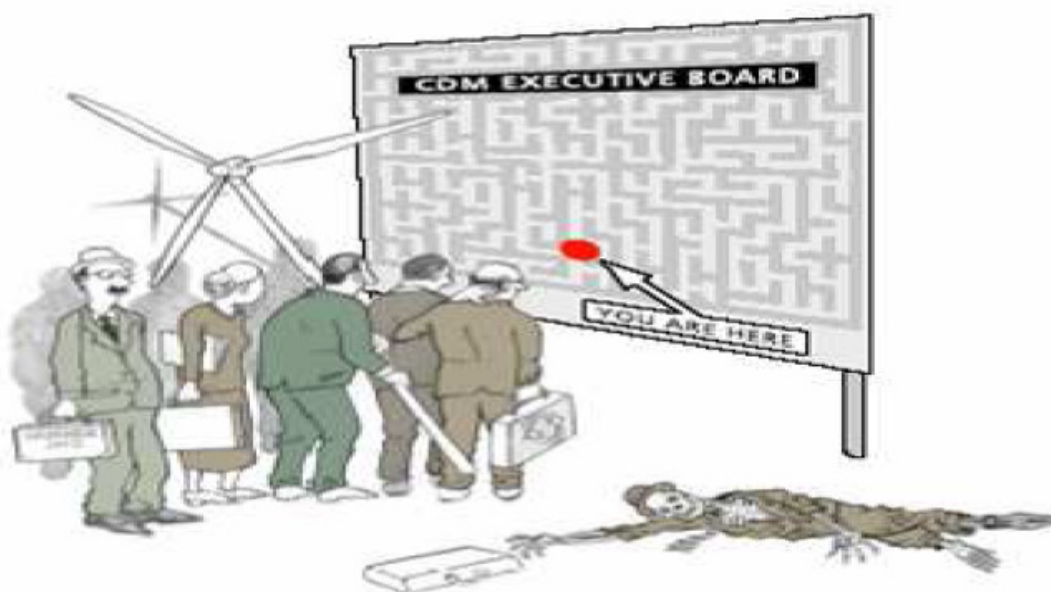
The project meets the CDM EB approved methodology AM 0041: '*Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production*'. However, Green Resources' has not at this stage developed a PDD for the project.



8.0 Conclusion

The CDM process aims to provide support to countries such as Tanzania in achieving sustainable development through the implementation of project activities and to contribute to the ultimate objective of the UNFCCC. CDM activities will therefore attract capital investment to Tanzania and bring growth and knowledge of climate change as a whole. While the process is possible and profitable for the nation as a whole, it is long, expensive and requires knowledge, expertise and a lot of patience. At present, very little, if any, local familiarity with the CDM exists in Tanzania. Working with both the private and public sectors will assist in building awareness on the opportunities and challenges in the CDM market. But also build capacity within the country in order to promote more project development for future CDM activities in Tanzania and Africa as a whole.

The road to issuance.....



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